Telephony

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THE AMERICAN TELEPHONE JOURNAL

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H. D. FARGO, President and Treasurer.
G. M. ALLEN, Mgr., Copy Department.

S. R. EDWARDS, Editor and Secretary

J. R. HASTIE, Vice-President and Advertising Manager.
S. J. BORCHERS, Assistant Advertising Manager.

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CURRENT OPINIONS AND COMMENTS

What can be done to overcome the unreasonable hostility of many rural and small-town subscribers toward the telephone companies which give them service?

The query is suggested by a letter TELEPHONY recently received from an Independent manufacturer. What moved him to agitate the subject was a reply received by his company to a form letter sent out to the field early in October. This form letter asked a number of medium-sized companies in the Middle West why they had not ordered any telephone equipment lately.

* * * *

One company, located in a Minnesota town, operating two exchanges and serving a large number of rural subscribers, in its answer explained in part:

"Our company has about three rural telephones to one in town. That tells the story of our feeling that we wish we never had been in the telephone business, are sorry we are in it now, and also sorry that we have to continue in it.

"Neither the rural public nor the commission is treating the rural telephone situation generously, nor even half-way fairly. We have lost money on that end of it for the entire 17 years we have been in it—and we see no material relief in sight now.

"We are not extending—in fact, we are taking out every telephone in the country we can, and buying nothing but batteries and minor necessities. No fault to find with you, but we will not be in the market for anything of importance for some time—and if we can keep out of the receiver's hands, we will be lucky."

* * * *

Now the foregoing is not typical of the entire situation. Maybe the writer was bilious, or in a gloomy mood, but he touches on a question that should be given attention. Commenting on his customer's letter, our friend, the Independent manufacturer, says:

"This letter is a composite of the attitude of many telephone people in the rural communities. There is only one plan I can conceive of that will overcome the general antipathy of rural and small-town subscribers towards public utilities and telephone companies in particular. That is a comprehensible educational campaign carried on under the supervision of the national and state telephone associations, something along the lines of the publicity campaign carried on by the Standard Oil Co., Illinois Central Railroad, Hardwood Lumber Association and the Fruit Growers' Association of California, which produces definite and valuable results.

"My remarks are prompted by the belief that the letter from our customer strikes at the root of the trouble with the telephone industry outside of the big cities, meaning the unjustified antagonism that exists in the rural districts and small towns. If this could be reduced, business would soon be worth while."

* * * *

We all know that the farmer was spoiled with the dollar telephone idea. He was given that rate in an early day and now fights hard whenever asked to give it up. The fact that in those early days the farmer was getting only 50 or 60 cents for his wheat and correspondingly low prices for all other crops, whereas now his products bring much higher figures, means nothing to him.

He used to pay only $12 a year for telephone service and it's his firm idea he should never have to pay any more. The company that endeavors to pry rural rates up a trifle is, in his mind, a grasping corporation that should be squelched—boycotted if necessary—and he roars accordingly.

To a less degree, the same thing is true of the small-town subscribers, although if they happen to be stockholders in the local telephone company, or know anything of conditions, they are more likely to take a more reasonable view of things. The fact remains, however, that there is a blind, unreasoning antagonism towards utility corporations in many rural sections, and that some organized effort should be made to overcome it. As our manufacturer recommends, the national and state associations should give this question careful attention.

* * * *

The companies and associations he mentions have done much to popularize their products by judicious advertising. By publicity they have sought to overcome prejudice and implant new and more favorable ideas in the minds of the dwellers in country sections.

In this day and age when the rural delivery brings the mails to every farmhouse regularly, publicity is an effective means to use in bringing information and arguments home to the farmer that will change his trend of thought. This is on the principle, which is still true—that while the cities have always made the most noise, it is the great rural population which counts for most in this country.

* * * *

If the truth were told, probably the average commission in handling a utility rate case—usually telephone rates in the rural districts—would grant the desired increase with little question if the farming element were agreeable to it. It is when they fear the farmers will kick, that the rate makers usually clamp down the lid and are most averse to giving a company more revenue.

Any effective effort, therefore, to educate the telephone users in farming communities and small towns as to the necessity of better rates would pay, as being in the direction of eliminating the hostility that has proved disastrous to utilities in many instances.

Right here it should be emphasized that the local operating company individually can do a great deal to cultivate the good will of such patrons, as well as the associations. Each telephone manager knows the peculiar "sore spots" on his subscriers' list, and if possible should heal them. His telephone association should be able to help him in this direction.

* * * *

Financial writers all over the country were amazed at the tremendous over-subscription to the 20-year bond issue of the New York Telephone Co. Small wonder, for the subscriptions were ten times the total amount of bonds offered, breaking all industrial records since the war, and indicating a wide desire on the part of the investing public to put their money into this security. This demand is considered a remarkable tribute to the stability of the telephone industry. New York is the largest city in the country, affording an immense field for service, but if the telephone industry as a whole were not believed by people generally to be safe, permanent and securely established as a prosperous enterprise, this unprecedented rush for telephone bonds would hardly have occurred.

Too bad this big-over subscription could not be passed along to utilities in other sections where capital for extensions is equally needed.

* * * *

When telephone companies, flooded with service calls, found it necessary to forbid their operators to tell subscribers the time of day, there were many complaints from persons who did not realize what a tax was imposed by such inquiries. Among them—and that but recently—was one from the editor of the Northwestern Christian Advocate. That he has seen the light is shown by the following which appeared in his editorial column lately:

"Apropos of a brief editorial note appearing in this paper some weeks ago expressing regret that a rule of the Illinois Bell Telephone Co. prevented their operators furnishing subscribers the time of day upon inquiry, we have received the following explanation, which we publish, with apologies, though we did want to know the time when every watch and clock on the place had gone on strike.

"Here is the statement: 'The average number of daily calls of the telephone company inquiring the time of day, before this service was discontinued, was 245,000 calls, which amounted to 9 per cent of the total telephone calls in the city of Chicago.'"

The Methodist editor showed he was fair and reasonable, when he was informed of the facts. The instance is typical, and strengthens the theory that the public is usually reasonable when fully informed of utility problems. It pays to keep them posted.

Your Characteristics--Know Them!

Telephone People, Dealing As They Do in Service to the Public, Are Interested in Human Nature—Here Are Presented Some Fundamentals Which Underlie an Understanding of People and Incidentally of Our Own Selves

By S. R. Edwards and Dr. J. M. Fitzgerald

Several years ago Henry Ford dumbfounded the manufacturing world with the announcement of the establishment of $5 as the minimum daily wage for his employes. Many declared him crazy and other similar expressions were passed around. Those, however, who were familiar with conditions, believed that he was taking a wise step—one that would result in increased efficiency. It did.

The labor turnover in Detroit at that time was in the neighborhood of 300 per cent; that is, to maintain a force of 1,000 men, it was necessary to employ 3,000—and conservative estimates placed the cost of hiring and training the new men at from $50 to $150 each.

But Ford employed more than 1,000 men. His force numbered in the thousands. The heavy labor turnover cost him several million dollars a year. Putting in effect a $5 a day minimum rate practically wiped out the labor turnover and saved him those several million dollars a year. It was an exceptionally shrewd and profitable innovation.

Employers generally are now aware of the high cost of hiring and firing, and are making every effort to establish better relations with employes and obtain a permanent working organization. One of the factors which is emphasized in these efforts is that greater care must be exercised in the selection of employes—obtaining men fitted by inclination and training for the work that is to be performed.

In recent years a number of methods have been developed for aid in selecting employes who will enjoy doing their particular job and develop into higher positions. Psychology and phrenology form the bases of these methods. Both bases have their advocates, but the latter method is productive of the best practical results as applied to the individual.

For years the medical profession has denied the possibility of localizing of brain centers, while phrenologists have contended that certain areas of the brain perform certain functions. In later years, medical authorities have changed their belief in localization of mental functioning, due to the findings in investigation of insanity and injuries to the brain. They now admit that there are as many as 50 different organs of the brain, each organ having a special faculty or power of the mind.

This changing trend of opinion in the medical profession indicates that the arguments set forth long ago by the early phrenologists as to the brain functions, are fundamentally sound.

In the preceding articles differences in people as to physical appearances and

shapes of the heads have been discussed. In modern character analysis and vocational adaptation, these appearances are taken into consideration. It is, indeed, very easy to check up on the three temperaments noted—*motive, mental and vital*—and the shape of the head which is typical of each.

Another factor which has a bearing is the coarseness or fineness of the person. This may be determined by the texture of the skin and hair and also by the language used. Coarseness tends toward animality, while the finer the hair and skin, the more sensitive the person. Coarseness always adds strength to a person's makeup and fineness, sensitiveness and susceptibility.

The person of the coarse temperament has a brain which is coarse in texture and not capable of appreciating the finer things. Observe the classes of men engaged in different kinds of work. The typical telephone engineer, for instance, is not of the coarse, strong type that is found among the civil engineers or mechanical and electrical engineers engaged in the installation of large power plants. The watchmaker is of a finer makeup than the machinist engaged in the machine shop where heavy work is turned out—yet both are high-grade mechanics.

Thus we see that a man through natural inclination takes toward doing work which harmonizes with the degree of refinement of his physical makeup.

The brain, being the seat of the mind, is acknowledged to control and direct our actions. From this point of view, its makeup as described by phrenologists is indeed very interesting.

Some 42 different faculties of the brain are classified and when a person is able to judge of the activities of each in their own self, an excellent idea of themselves, their tendencies and their possibilities may be obtained. These different faculties, and the characteristics which they produce, are listed as:

Amativeness: Love between the sexes.
Conjugality: Matrimony—love of one.
Parental love: Regard for offspring, pets, etc.
Friendship: Adhesiveness—sociability.
Inhabitiveness: Love of home.
Continuity: One thing at a time.
Vitativeness: Love of life.
Combativeness: Resistance—defense
Destructiveness: Executiveness—force.
Alimentiveness: Appetite—hunger.
Acquisitiveness: Perception of values—accumulation.
Secretiveness: Policy—management.
Cautiousness: Prudence—provision.
Approbativeness: Ambition—display.
Self-esteem: Self-respect—dignity.
Firmness: Decision—perseverance.
Conscientiousness: Justice—equity.
Hope: Expectation—enterprise.
Spirituality: Intuition—faith, credulity.
Veneration: Devotion—respect.
Benevolence: Kindness—goodness.
Constructiveness: Invention — correlation of ideas—mechanics.
Ideality: Refinement—taste, purity.
Sublimity: Love of grandeur—infinitude.
Imitation: Copying—patterning.
Mirthfulness: Jocoseness—wit, fun.
Individuality: Observation—desire to see.
Form: Recollection of shape.
Size: Measuring by the eye.
Weight: Balancing—climbing.
Color: Judgment of colors.
Order: Method—system, arrangement.
Calculation: Mental arithmetic.
Locality: Recollection of places.
Eventuality: Memory of events—narrative.
Time: Cognizance of duration.
Tune: Sense of harmony and melody.
Language: Expression of ideas.
Causality: Applying causes to effect.
Comparison: Inductive reasoning—illustration.
Human Nature: Perception of motives.
Agreeableness: Pleasantness—suavity.

Of course, in no one person are all of these faculties equally developed—for no one is perfect, and no two persons are alike.

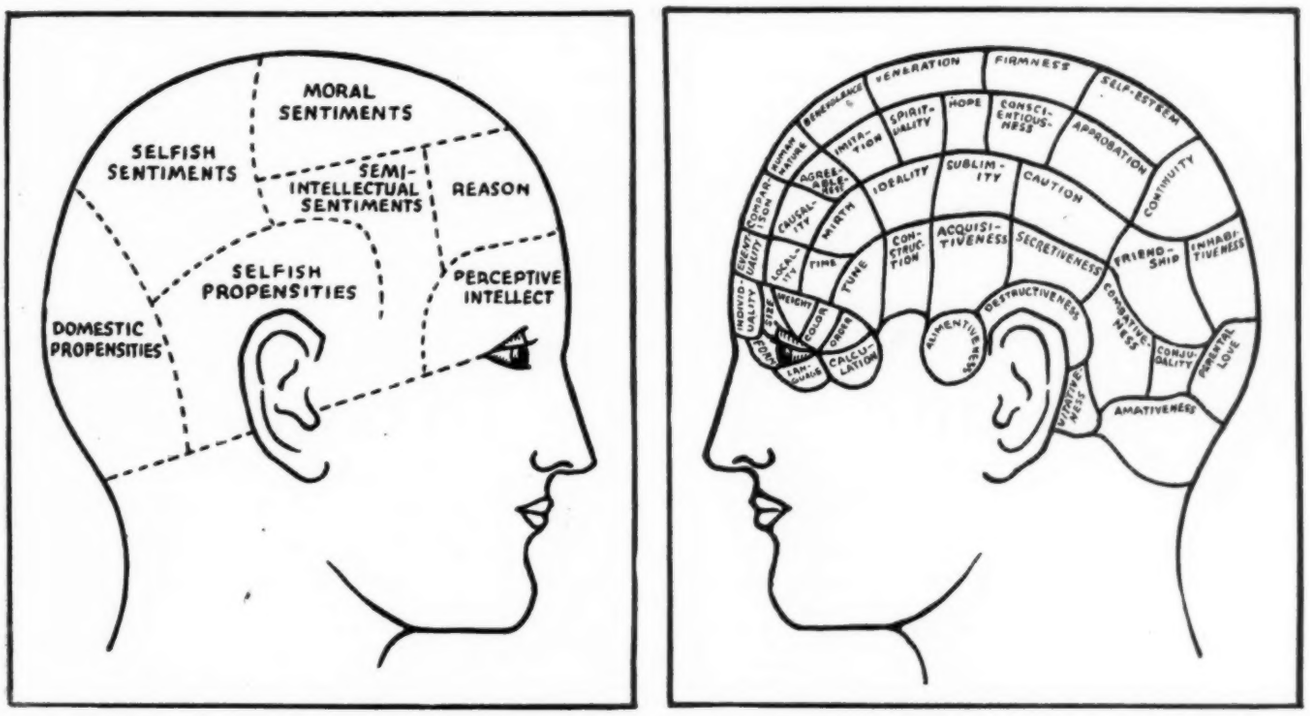
These faculties may be arranged in groups known as propensities and sentiments, and the intellect, the latter of which corresponds with the forehead.

The propensities are sources of impulses which incite only to certain actions. They are known as the selfish propensities and the domestic propensities and lie in the side and back head.

Sentiments are the sources of other feelings not limited to inclination alone but have an emotion of a different kind superadded. There are the selfish sentiments, the moral sentiments, and the semi-intellectual sentiments.

In addition to these, are the perceptive or observing faculties.

The locations of the various faculties, propensities and sentiments are shown in the illustrations. Regardless of whether



Many Different Characteristics Enter Into What Is Termed "Human Nature"—There Are Elements by Which an Individual's Leading Characteristics May Be "Sized Up" by Observation of Head, Facial and Physical Appearances.

the reader believes in localization of brain functions, the list of characteristics is a most valuable one in checking up one's character. Everyone possesses the various characteristics to a greater or lesser degree—the extent of which can be determined also by words and actions.

The domestic propensities are grouped in the lower back head. They are amativeness, conjugality, parental love, friendship, and inhabitiveness. These are the faculties that constitute man a social and domestic being. They relate to family, home, country and friends.

The selfish propensities are located in the lower side head around the ears. They are: Vitativeness, combativeness, destructiveness, alimentiveness, acquisitiveness, and secretiveness. They relate to the maintenance of the individual's existence and lead one to make provision for his animal wants and to assert and defend his rights of person and property.

The selfish sentiments are located in the upper rear or crown head, just above the domestic propensities. Cautiousness, approbation, self-esteem and firmness are in this group. They manifest those feelings which are known by the terms prudence, ambition, independence, and stability of character.

The moral sentiments are found in the top head toward the front, forward of the selfish sentiments. It is these faculties that constitute man a moral and accountable individual. They are conscientiousness, hope, spirituality, veneration, and benevolence. They influence a person to be of service to his fellow men, to worship God, and to expect a future state of existence.

The semi-intellectual sentiments are located in the forward part of the side head just in front of the ear. Constructiveness, ideality, sublimity, and imitation comprise this group. They supply the love of the beautiful, nature and art and the ability to construct things essential to comfort or to convenience of life.

The intellectual faculties are comprised of the perceptive and reflective faculties. The perceptive or observing faculties are individuality, form, size, weight, color, order, calculation and locality. They are located in the lower frontal region of the brain, over the eyes. They bring one into direct communication with the external world and give a knowledge of existence, equalities and the singular relation of the things which exist around us.

The reflective faculties compare and classify the facts collected by the perceptives, trace out their more remote relations, and supply the power to reason. The reflectives are comprised of comparison, casuality, mirth, human nature and agreeableness, and are located in the upper part of the forehead. They give width, height and fullness to the forehead.

What are known as the literary faculties are situated between the perceptives and reflective faculties. They are comprised of eventuality, time, tune and language. These faculties enable us to remember and communicate the facts collected by the observing faculties and give us an idea of duration and time and harmony in sound.

What are your strong or prominent characteristics? Are you using them to the best advantage in your everyday business, social and family life? It's worth while to think about yourself for if you earn $1,500 you represent a capital investment of approximately $21,500 at the interest rates utilities have to pay for money. Surely that large an investment requires some attention and thought.

In different persons, the various qualities which have been mentioned are of different size and activity or development. It is these differences that bring about our likes and dislikes, for various kinds of work. We'll talk about these various faculties or functions and their combinations in other articles.

Telephone Traffic Interference

Interference by Electric Light and Power Lines with Telephone Traffic from Telephone Company's Veiwpoint—Both Services Modern Necessities—Paper Presented at Convention of United States Independent Telephone Association

By Sergius P. Grace

Engineer on Foreign Wire Relations, American Telephone & Telegraph Co.

I do not suppose that there are very many here who can say with me that we attended the initial convention of this association in Detroit, Michigan, in the year 1897, just a quarter of a century ago. Since that time many events have happened in telephone history. For a time during the tremendous onward rush of telephone development starting in the early nineties, there was strife between competing telephone systems, but in recent years there has been a clearing of the telephone atmosphere and we realize that there is an opportunity for all of us in the continued development of the mightiest high-speed tool of civilization—the telephone.

A few weeks ago the public, as well as average technical men, were amazed when the press announced the successful transmission by the General Electric Co. of electrical power at the enormous pressure of one million volts. Following the statements in the press, there were articles in the technical journals describing for the benefit of the engineer the way in which this great voltage had been controlled. It does not appear that in the near future there is any likelihood of such high voltages being needed in practice, but it should be kept in mind by all telephone people that the electric power engineers have blazed the way so that when needed, a million volts for power transmission is at the command of man.

Contrasted with this achievement, let us look back only a few years ago into the early eighties when Edison developed the three-wire system of electrical distribution and introduced what was then the high pressure of 220 volts. For several years this system remained the standard, but far-seeing power engineers soon recognized that higher voltages must be used in order to reduce the tremendous cost of the large copper mains.

George Westinghouse, ever inventing and ever seeking for new inventions which he could exploit, purchased the American transformer patents of Gaulard and Gibbs, and began in this country the development of electrical service at 1,000 to 2,300 volts alternating in conjunction with transformers to step down the voltage at the customer's premises.

These comparatively high voltage systems were strenuously opposed by the advocates of the direct current three-wire Edison circuits, and there were most bitter controversies of a patent, political and business nature between the two rivals. It was a foregone conclusion that the higher voltage systems were economically sound and would win out in the end, as they eventually did, in this battle of the voltages.

From that time on, step-by-step, electrical pressures for power disribution have been rising. The engineers of the great General Electric and Westinghouse companies have shown consummate skill in devising power machinery that would generate and receive ever higher voltages. Each increase in voltage meant a reduction in the cost of the transmission line and a greater distance to which the power could be economically transmitted. Very rapidly then in recent years we have witnessed transmission voltages rising from 11,000 to 22,000, to 66,000, to 110,000, and now as a climax, for the present, we will shortly see the operation in California of

a 220,000-volt line which will transmit power from the waterfalls in the mountains 285 miles away to the cities and towns along the Pacific coast.

There seems to be no limit to the demand for electric light and power service. In a relatively short time this country will be known as an electrical country where practically all illumination is electric and where nearly every wheel is turned by electricity.

Having sketched thus briefly the rapid development of electric light and power service, it is in order that a glance be taken at the marvelous development of the telephone during practically a contemporaneous period. Previously I referred to Edison's part in the development of the electric light. Many of you probably know that only a few years prior to his work on electric lighting systems Edison was busily engaged in the improvement of Bell's telephone and contributed to the art the very notable achievement of the carbon transmitter.

Some years ago while in Pittsburgh, Pa., I came across in the files of the Bell Telephone Co. a number of old letters of Edison's in his own handwriting, written in 1877 to T. B. A. David, who at that time had a small wire system in Pittsburgh for the distribution of news and business memoranda by means of Gray printing telegraphs. This company of Mr. David's later became the Central District Bell Telephone Co. of Pittsburgh and vicinity.

Mr. Edison had promised to send Mr. David a set of his recently-invented carbon transmitter telephones to try out in Pittsburgh over the printing telegraph wires, and in order to give you a picture of the state of the telephone art at that time, I present one of these letters:

Menlo Park, N. J., Aug. 29, '77.

Friend David:

I think those telephones must have got banged around, as they worked beautifully in New York all day, and a similar pair taken by my Montreal man are now working in Montreal O. K. One pair on Dutton and Townsend's line in New York, 2½ miles long, has been working perfectly 13 days to date, and they have noted it on their slips which Mr. Orton saw. You must bear with me a little while until I can finish my machine for making those silks properly. I had to make your sets with a pair of pliers and two pieces of hard rubber.

The proper way to adjust them if they are way out is to adjust one rather close and the other far away, bringing it gradually closer until you hear the other man say, "All right." You can then turn around and adjust yours away and come closer until he says "All right," but I think adjusting will not be necessary when my silk resistance machine is O. K.

Yours,

T. A. Edison.

What a pygmy the telephone then was and what a giant it has since become! In the intervening years from Bell's and Edison's time, we have added metallic circuits, transpositions, paper-insulated lead-covered wires, hard-drawn copper wire, long distance transmitters, lamp signals, common battery systems of operation, phantom coils, high-efficiency receivers, and lately, three very important developments which seem sure to have a most profound effect on the future of the telephone, namely: Pupin loading coils, automatic or machine switchboards, and the vacuum tube amplifier, the latter being most aptly called the Aladdin lamp of the telephone.

It was the amplifier that last Friday on Armistice day made possible the simultaneous spreading of President Harding's voice to assembled multitudes in New York and San Francisco, when he spoke so wondrously at the bier of the Unknown Soldier at Arlington.

In this country today, millions of people in their everyday life rely on telephone service for the carrying on of their business transactions and their social intercourse. Hard times seem to affect the demand for telephone service but little and no one in the telephone business yet has the temerity to predict what will be the ultimate point of the development of the telephone.

During all these years of the development of the telephone, "noise" both from internal and external causes has been the "bete noir" of the telephone engineer. As Vice-President Gherardi, of the American Telephone & Telegraph Co., very aptly pointed out in one of our discussions with the engineers of the National Electric Light Association, telephone engineers for the past 40 years have been compelled to struggle with the elimination of inductive noises in their circuits and devise ways and means of balancing telephone circuits so as to make them as immune as possible from disturbances caused either by adjacent telephone circuits or neighboring power wires.

The telephone engineers in developing this high degree of balance have found it necessary not only to keep the line wires themselves balanced but to introduce terminal and intermediate apparatus whose electrical constants would be as nearly identical as complex calculations, fine design and close manufacture could produce. Those of us who remember the old type wooden box No. 8 repeating coils will realize the tremendous advances which have been made by comparing them with modern types of toroidally constructed repeating coils, phantom coils, loading coils, etc. Similar startling developments have taken place in other parts of the telephone system.

During this same period the power engineers have also been busy in the development of electric light and power apparatus and since Edison's time there has been produced a veritable wealth of power equipment. To describe adequately the electrical power machinery of today would require much more space than can be given in this paper, and to do it full justice, would necessitate a large number of admiring superlatives. However, I should now like to point out that the power engineers in the development of their lines and apparatus, outside of lightning disturbances, have never been called upon to contend with adverse influences from neighboring circuits.

Their lines were so powerful in themselves that they could go where they pleased without danger of disturbance, and certainly telephone and telegraph wires could do them no harm. Power circuits while occupying little space as seen by the eye, really occupy a very considerable amount of space if there be included the electric and magnetic fields spreading out from them. It is these strong radiating fields which have an adverse effect upon adjacent communication circuits.

Until recent years there has been little co-operative work by telephone engineers with power engineers in an attempt to get the latter to realize the adverse effect on communication circuits of these stray fields, and to apply measures in the design of their machinery and the construction of their lines which would reduce to a minimum these external fields and their deleterious resultant effects.

In the matter of the prevention of physical hazard from high-tension lines at crossings and conflicting locations, as well

HINTS ON THRIFT.

Very few of us but have heard the Scotch adage, "Mony mickles mak' a muckle." And in the case of the operations of a large company, it would surprise many to learn the aggregate money value of small articles that are wasted here and there from day to day. The need to practice saving is always urgent, and the sum total of a year's carefulness of many employes will amount to considerable.

Repeating a small saving is the best economy. Try this out and see:

Linemen can cut out guessing and measure instead. They can use small pieces of wire instead of clipping off a long piece. Clerks can save ink by closing the wells when not in use; they can refrain from needless use of office appliances for filing documents, or in using printed forms for scratch pads. These are only a few of the many things that will occur to everyone.

Make economical use of time and stores. Don't practice false economy—that means doing a task over again. Don't skimp or scamp. Use intelligence and care.—Telephone Talk.

as the joint use of pole lines where only low voltage power is involved, there has been a large amount of co-operative work for a long time between power and telephone engineers, with the result that standards have been quite generally agreed upon covering such situations.

It may very properly be asked why the telephone companies are these days laying such stress on the effects of induction from power wires when for so many years telephone circuits have been operated in the vicinity of power wires and apparently a very satisfactory grade of service given to the public. This is a question very frequently asked by the power engineer.

The answer is that during the early stage of power development it was confined to the cities and comparatively low voltages were in use, and further, whereever the power lines were in the vicinity of the telephone wires, the lengths of parallels were usually short; but as previously pointed out, the second great stage of power development has brought about the use of high voltage transmission lines, connecting together numbers of cities and towns and these high voltage lines running across country have in some cases been placed for many miles in close proximity to communication circuits.

Under these conditions of high voltage and close proximity, the problem of continuing to give good telephone service becomes extremely difficult, and in some cases may be impossible of solution without adequate separation of the power and communication lines.

Speaking frankly, the telephone companies are now pressing this question because the pace of high-voltage electrical interference has become too swift for them to keep up with by any means at their command, and they have reached the point where they cannot do all of the prevention and mitigation in their own lines but must call on the power companies to cooperate and help in the solution of interference problems if high grade telephone service is to be preserved to the public at a reasonable cost.

Greek mythology speaks of Sisyphus, who was condemned eternally to roll a huge stone up a steep hill, only to see it roll down again each time the top was reached. The telephone companies certainly do not wish to emulate Sisyphus and, therefore, are asking the power companies to co-operate with them in the solution of the interference problem so that when they finally roll the stone of induction to the summit of solution, it will remain there.

It must be recognized from an electrical standpoint that the power companies and telephone companies are by no means on an even footing. The telephone circuits are infinitely more sensitive than the power lines and under certain conditions can be put completely out of business by the latter. On the other hand, there appears to be no possibility of currents on telephone lines ever putting a power line out of business. This factor is fundamental in the discussion of this entire subject. It explains the anxiety of the telephone companies to obtain proper separation in cases of parallels; it also explains their insistance upon other remedial measures demanded by the necessity of each case.

ENRICHMENT OF LIFE

There are two things necessary for the enrichment of life, mentally, physically, socially and spiritually. They are very simple and are known of all men. One is hard work and the other is a determination to do right.—Calvin Coolidge.

What is electrical interference? To answer this question adequately for you would require going into technical details far beyond the limit of this paper, and so I shall touch only very briefly upon the technical aspects of electrical interference. Broadly speaking, it is a transfer of electrical energy of such a magnitude and character from a power line through space to a telephone line in parallel proximity as to be sufficient to cause a substantial impairment of the telephone service by the resultant humming effect in the receiver, or the electrical breaking down of the apparatus.

From our studies of this subject, we know that the magnitude of the energy transferred from the power line increases with the voltage and current, with the length of the parallel involved, and with certain other features. The character of the energy transferred from the power line, however, depends upon the wave shape of the transmitted voltage and current.

Most transmission lines are operated at 60 cycles, but because of generator, transformer and other features of design and operation, there are usually present harmonics or multiples of the 60-cycle fundamental which have the effect of producing ripples of telephone frequency in the fundamental wave. It is these higher harmonics of telephone frequency which have the greatest disturbing effect in adjacent telephone circuits.

The effect of power induction on adjacent telephone lines can be greatly reduced by a careful balancing of the load in the different phase wires by smoothing the wave shape, by proper configuration of the conductors and by transpositions which are laid out to co-ordinate with transpositions in the telephone lines. On the part of the telephone company there is considerable which can be, and usually is, done to reduce to a minimum the effect on the services of the energy transmitted through space from the power lines.

Fortunately for the sake of reducing crosstalk, telephone circuits inherently require careful balance, and many of the same devices used to eliminate crosstalk have the effect of reducing very materially the induction from outside circuits. This reduction of noise and crosstalk is secured by keeping the resistance of the two sides of the communication line equal, by repeating coils having balanced electrical characteristics, by inserting loading coils only at proper neutral points, by maintaining high insulation of the line wires, etc. The degree of balance in telephone lines and apparatus has had, however, to be carried to a higher point because of induction from power lines than if crosstalk alone were to be considered.

In addition to these standard measures, special transpositions co-ordinated with the power transpositions are necessary if the parallel is of any appreciable length.

Notwithstanding all these measures, there will be severe interference in the cases of long parallels at the times of abnormal disturbances in the power circuits caused by broken insulators, switching, etc. At these times large amounts of power may pass over the power lines in an unbalanced condition, causing heavy residual currents through the earth.

Under these circumstances, neither the transpositions in the power wires nor the transpositions in the telephone wires are of any appreciable value, and breakdowns of the telephone apparatus as well as loss of service will result. Obviously, in the operation of the power lines, these periods of abnormal operation must be held to an absolute minimum.

The engineers of the American Telephone & Telegraph Co., through experimental work, have collected a large amount of data on the effects of induction and the remedies for overcoming or mitigating it, and I shall be glad to tell any one particularly interested where these data, many of which have been published, can be consulted.

The question may now be asked by some of you, as it is frequently by power engineers: "Why not always use these co-ordinative remedial measures in both the power line and the telephone line if by so doing substantial impairment in the telephone service can be avoided rather than in some cases ask that the power lines be routed on a separate highway?"

Unfortunately, even with the most perfectly designed, constructed and maintained co-ordinated transposition systems, there still remains, in the case of long parallels, a resultant amount of noise in the telephone lines which brings about an impairment in the service. If this noise be not of a magnitude to cause serious annoyance to the people talking over the circuit, it is true that the loss in intelligibility may to a certain extent be compensated for by larger copper in the telephone lines, thus bringing up the margin

of telephone transmission and reducing the percentage effect of the disturbance from the power wires. If this plan were generally followed, the cost of the telephone plant would be very materially increased.

It should, therefore, be clearly recognized that there are some cases where adequate separation of the power and communication lines may prove the only means of preserving the telephone service from substantial impairment.

From what has been said so far on the subject of inductive interference, I believe you will agree with me that it is a real and not an imaginary quantity we have to deal with and should be given the closest attention by the engineers and executives of both the power and communication utilities to the end that telephone service be not impaired but at the same time power service be given every opportunity to expand.

I think that you will all appreciate the very fine attitude toward the problem of inductive interference taken by the eminent power engineer and executive, Dr. William McClellan, president of the American Institute of Electrical Engineers, before the Ohio Electric Light Association this year. He said, in part, as follows:

"I am not going to bring to you this afternoon the electrical side of inductive interference, because, as a matter of fact, no one person can do that. Perhaps, as now representing the electrical engineers in a special way, I could take a middle ground among them all, but the electrical side of inductive interference has got to be presented by a great many interests, a great many interested people—the railroads, the telephone people, the electric railway people, the electric light people, and the power transmission group, if you choose to consider that as a separate group.

"Each one has a view of it; each one is vitally interested in it; their views cannot be alike, and the problem can only be settled by in some way getting all those views together and having a committee which is large enough to be able to step around to the several points of view so that the problem can be understood from all sides, and in that way a real, logical rational working solution reached."

"Of course, we are going to come to the practical problem. We have all had it. There is not a man here that operates a company that hasn't had it. Here is a street. Both companies want to go down it; it may be only 40 feet wide; there are good reasons on both sides why both companies should go into that street. How are you going to do it?

"There is a question of joint lines, a question of separate lines, a question of types of lines, and a question of inductive interference, lowering the telephone company's service; of course there is no question, we can't deny, that under certain conditions, we do interfere with the quality of their service."

"There are going to be times come when apparently the difficulty cannot be solved—but it can; there is some way out; we are all in public service, and if you will approach it from the attitude I am taking, those difficulties can be solved."

"I know of two or three cases where two public utilities have come up before a public utility commission quarreling, and I have thought it is one of the most serious things that could happen before the commission, because certainly if two public utilities, both with the same general kind of business and the same general problems, can't sit down around the table and compose any differences, it does seem to me as if they couldn't be expected to handle the larger problems of composing differences with the public."

"Now this whole question comes down to a matter of faith in each other—faith in each other's purposes—and I want to bear testimony to the faith that I have in the good intentions, and the high purpose, of engineers in connection with these various groups of public utilities."

Coming now concretely to the solution of the interference problem, what is to be done about it? Shall the power companies ignore the effect of the energy from their lines on communication circuits and then, shall the telephone companies after doing everything within reason to prevent impairment of their service, resort to courts and commissions for protection? Such a plan of procedure in these days of co-operative solutions of all kinds of problems, and with the inspiring example of the nations now before us in Washington, would be the height of business and engineering folly.

The executives and engineers of both utilities must unite and work together in the solution of this problem so that in the end the public may enjoy a maximum amount of both services at a minimum total cost. It seems to me that only as a last extremity should there be a resort to legal action and I, therefore, do not wish in this paper to discuss the legal rights of either side. A willingness to co-operate I think should be taken as an indication that each side believes in the strength of its position and the justice of its cause, and for these reasons are willing to meet on a joint basis of negotiation in the settlement of differences. As Dr. McClellan said, "Let us have faith in each other."

During the year the leading minds in the National Electric Light Association and the American Telephone & Telegraph Co. came to the conclusion that the solution of the interference problem, which had been engendering considerable bad feeling between the respective utilities, should and could be solved by co-operative action in the laying down of rules and principles which would serve as guides to practice in the solution of specific cases of interference between member companies of the National Electric Light Association and the Bell telephone companies.

There have appeared from time to time in the technical press allusions to the general committee which was formed to carry on this work, and I think you are familiar with their names. The complete committee is as follows:

O. D. Young, vice-president, General Electric Co.; R. H. Ballard, vice-president and general manager, Southern California Edison Co.; R. F. Pack, vice-president and general manager, Northern States Power Co.; M. H. Aylesworth, executive manager, National Electric Light Association; Martin J. Insull, vice-president, Middle West Utilities Co.; W. W. Freeman, president, Union Gas & Electric Co., Cincinnati; General Guy E. Tripp, chairman of the board, Westinghouse Electric & Mfg. Co.; Col. John J. Carty, vice-president, American Telephone & Telegraph Co.; E. K. Hall, vice-president, American Telephone & Telegraph Co.; Bancroft Gherardi, vice-president, American Telephone & Telegraph Co.; and Ben. S. Read, president, Mountain States Telephone & Telegraph Co.

At a meeting last March, a subcommittee consisting of Bancroft Gherardi, vice-president of the American Telephone & Telegraph Co., and R. F. Pack, vice-president of the Northern States Power Co., was formed to prepare a report to the general committee, outlining the proper engineering solutions of interference cases but without reference as to how the costs should be allocated.

In the carrying on of the work of this subcommittee, Mr. Pack has been assisted by W. J. Canada, electrical engineer of the National Electric Light Association, A. E. Silver, of the Electric Bond & Share Co., and F. H. Lane, of H. M. Byllesby Co.; Mr. Gherardi has been assisted by H. P. Charlesworth, H. S. Warren, H. S. Osborne and myself. This committee has held eight meetings and I am pleased to say that the power engineers have co-operated with us in a very broad-minded and fair way in an honest endeavor to determine the guiding rules and principles for the best engineering solutions of interference problems.

At the present time we are engaged in the preparation of a report to the general committee covering our work of the past summer. I think we should all confidently hope that the general committee will, in the course of a few months, send out information which will prove mutually helpful to the communication and power utilities in the solving of the problem brought about by the proximity of power and communication lines.

In the meantime, my earnest suggestion

is that each one of you do everything possible to co-operate with the power companies in your neighborhood. From my experience I am sure that you will find them sympathetic with your desire to continue the rendering of good telephone service.

The majority of these power engineers and executives have been so engrossed in the development of their own business, and so involved in the solution of their own complex problems of power distribution, that they have had but little chance to give any thought to the possible inductive effect of their circuits on your lines. On the other hand, we in the telephone field have been largely to blame for this lack of knowledge on the part of the power people as to inductive interference because few of us have ever gone one step out of our way to educate the power companies into an appreciation of the difficulties of giving telephone service, particularly when affected by neighboring power lines.

Do everything in your power to remedy this omission on our part and at your first opportunity, show your power neighbors your telephone plants, and explain to them the way in which your circuits operate. With this ground work of knowledge, every reasonable power engineer and executive—and I am sure nearly 100 per cent of them are reasonable—will co-operate with you to the fullest extent in keeping the service free from impairment.

May I also suggest that in your intercourse with your power neighbors you take the opportunity of learning all you can with reference to the methods used in the distribution of electric light and power. In thus knowing as intimately as possible the methods of power operation, you will be in a position to avoid the making of unreasonable requests on the power companies. The power companies have difficult problems to solve and we should not hinder them in any undue way in the furnishing of power service.

By establishing close relations with the power company in your neighborhood, arrangements can be made so that you will know when any high tension transmission line is contemplated, and before any money is spent, either for plans or right of way, it will be possible for your engineers and the engineers of the power company to get together and determine what is the best route for the proposed transmission line.

Many times it will be possible for the transmission line to be routed over a different road from that occupied by your toll line at practically the same or, in some cases, at a little greater cost. The greater cost may be justified in many cases in view of the cost of the transpositions and other remedial measures which would be required if the power line was constructed along the same highway with your toll line, and besides, it must be remembered that even the best co-ordinated transposition systems do not eliminate all of the inductive effects under normal power operation and that during times of abnormal operation of the power lines the transpositions are of practically no value and the adjacent communication lines will be seriously affected.

In the same way the telephone companies should keep the power companies informed of proposed telephone lines so that the best locations can be chosen for the telephone lines, free from the effects of existing or proposed power circuits. I shall not say anything as to how the costs of such work should be divided for I believe that prior to recommendations, which it is hoped the general committee will make on this subject, you will be able to work out with your power company satisfactory arrangements for the distribution of costs in each specific case.

One other admonition I should like to give you. I know the difficulty of maintaining telephone lines in a high state of electrical balance free from tree grounds, broken insulators, etc., but in recent years all of us have realized that in order to give high grade service, our lines, even where power wires are not involved, must be maintained close to perfection.

If power wires are in the vicinity of telephone lines, then no longer can poor maintenance of the telephone lines be tolerated, and in adjusting specific cases of interference with your power neighbor, I believe he has the right to expect that as one of the measures toward securing freedom from impairment of the telephone service, the maintenance of the telephone lines must be kept high class—that is, close to perfection.

One thing more—undoubtedly there are many cases existing in your various territories where there is bad interference between the power wires and the telephone wires. I think that every effort should be made to clean up these cases in an orderly and systematic manner.

In conclusion, let us realize to the fullest extent that the power companies and the telephone companies must live together in the same communities. The public desires both services and, in the giving of these services, capital must be conserved to the very utmost. Economy today is the watchword and an inefficient design of either the telephone or power system which results in an increased total cost of both services to the public will not long be tolerated, and unless we, ourselves, find the currect solutions, public opinion will require that others attempt to find the solutions for us. Certainly we ought to be able to do a better job than outsiders.

"LET'S GO!"

By Miss Anne Barnes

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa.

In order to attain any degree of success in a public service, we must possess three positive qualifications. If we do not possess all three of them, we must cultivate them.

The first is interest. When we come in contact with sales people who show interest in the possible sale, from the buyer's viewpoint as well as from the firm's, the sale is usually made.

But, I believe, we have all had the experience of being served by sales people who have gone through the performance of showing us the goods which we have asked to see, in a perfectly detached manner. The result was that we have gone away with a bad impression of the management, and will not return to that store if we can help it.

For an employe to be *at par* or *below* par in the service rendered an employer indicates that the quality of service given should have constant supervision.

Many employes are like horses in one respect, as they need to have guiding reins—supervision—so that they will do what is required of them. The brain matter used, of course, is at the end of the reins farthest from the employes.

The second qualification is knowledge of our work. If we are interested in our employment, we naturally learn something every day, which we did not know the day before. The world is moving at a rapid pace and what we *have* learned will not profit us much if we do not keep apace with progress. We should not keep apace by *running*—we should be *there* perfectly serene and confident.

Confidence is the third qualification. It is acquired by giving our interested attention and effort to every task assigned us, no matter how unimportant that task may seem. The result will be a perfect understanding of the work we are doing—*to date.*

We never graduate in the world of business. We are either *behind* the job, *catching up* to it, or, *there.*

Practical Hints—What's Your Pet One?

How He Convinced Farmers of Need of Soldered Joints.

T. N. Grindrod, of the Wyoming Mutual Telephone Co., Wyoming, Iowa, is lineman for the organization and a great many of its subscribers have been complaining on the service which they are getting from their telephones. Mr. Grindrod argued for a long time that the people should provide adequate grounds, especially in view of the fact that all lines in his section of the country with the exception of toll lines and a few local lines, which parallel electric leads, are of the grounded type.

Of course, they all argued that the rod was perfectly solid and the wire was still in existence, and that made it good enough. By calling to their attention the fact that a low-resistance ringer would not work well on a line with 1,600 ohm telephones, he caused them to see that if high resistance were inserted in the line at any point, whether it was a ground connection or otherwise, they would have poor service.

He then provided himself with a portable voltmeter (made by the Electric Specialty Co. of Cedar Rapids, Iowa) which had scales and connections for reading either volts or ohms' resistance. This was very small—its case complete with batteries made it only about 4½ ins. by 6½ ins. by 5 ins. With this voltmeter he made a test of the resistance between the ground wire and the rod, through the joint, which was originally made in many instances by twisting the wire around the brightened iron.

He then drove another ground rod beside the first one and made a voltmeter test between the two, which usually showed either no resistance or merely one or two ohms.

When testing through the connection which had weathered the storms of many months, he was, himself, surprised to learn that there was a great variety of degrees of efficiency in various ground connections, some of them showing a resistance running from 300 to as high as 2,500 ohms with a perfect connection made on the ground wire and on the ground rod and with only about 2½ to 3 inches of metal interposed between the testing clips.

It did not take any argument after this sort of a test made in the presence of a telephone subscriber to convince him, that a new ground rod was needed and that a soldered joint was of utmost importance. Of course, when this was completed, with a new installation, the service was greatly improved and the subscribers were willing to give Mr. Grindrod credit for having used his head.

Climbing a Telephone Pole—Here's How It's Done in the Movies.

How Telephone Poles Are Used in the Movies.

The accompanying illustration shows how telephone poles are used in moving picture studios. The photograph shows a wall and a telephone pole built at an angle of 45 degrees. An actor can walk up the pole to the top or slide down or do other sunts that appear to violate every principle of the well-known law of gravity.

Loss of Magnetism May Cause Receiver Trouble.

One of the things which may cause receiver trouble is a weak magnetism in the permanent magnet. This loss of magnetism may be due to the fact that the receiver has not been poled—that is, the current reverses the coils in such a way that the induced poles are opposite to the permanent magnet poles.

It is possible to determine the strength of the permanent magnet by the force with which it pulls the diaphragm. A receiver that has sufficient magnetism will lift the diaphragm edgewise.

If one of the poles should be reversed, a test can be made by taking another receiver, one that is properly poled, and holding both receivers together so that the pole pieces of each are opposite to those of the other. Then, the second receiver should be turned through 180 degrees so that its poles just change places with their first position.

The two receivers will attract each other in one position and repel each other in the other, if the first receiver is O. K. If one of the poles of the first receiver is reversed, so that it either has two south or two north poles, the two receivers will attract each other at each position in the test.

Possibly one of the bobbins on the pole pieces may be reversed in the assembly of the parts and this would cause the trouble referred to in the preceding paragraphs. A loss of magnetism is also caused by dropping the receiver.

Use of Repeaters On Long Distance Telephony.

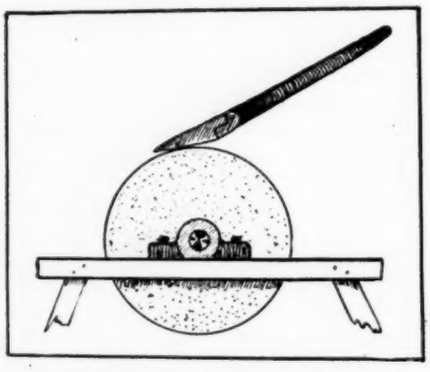
The New York to San Francisco and Los Angeles trans-continental telephone line, according to Prof. J. A. Fleming, would have been quite impossible without the assistance of the thermionic valve. The copper equivalent of that line alone is equal to 140 miles of standard cable, which is about five times the possible distance of good speech, but by the introduction of 13 repeater stations, it has been brought down to the equated length of 12 miles of standard cable.

There are about 2,400 miles of trunk cables in use in the United States, and in a short time cable circuits about 1,000 miles long will be in operation. Recently a four-wire cable circuit slightly longer than this was put into service for commercial trial by looping back and forth in a cable between New York and Reading, Pa.

The circuit is of approximately 20-lb. conductors, loaded and phantomed, and the total equivalent is 550 standard miles. With the aid of 22 repeater sets operating in tandem, an equivalent of 10 standard miles with excellent quality has been achieved and all arrangements have been perfected, so that this circuit can be maintained in commercial service as long as is desirable.

One Method of Sharpening Dull Diagonal Pliers.

One method of sharpening dull diagonal pliers that has been tested out and found satisfactory is to hold the pliers



A Simple Method of Sharpening Diagonal Pliers.

on a grinder as shown in the accompanying sketch, with back down until both cutting edges meet perfectly. After the edges have been carefully trimmed with a hone, the job is finished.

Care must be taken not to grind away more than just enough to make a sharp edge. Anyone able to sharpen tools can sharpen pliers in this way.

Tools Needed for Work on Substation Installations.

It is often a question as to just what tools a substation installer needs in his work. The following list gives some idea of those which are required:

For inside work, the installer will need a brace, hammer, bits, pliers and a screw driver. These are all very necessary. He might add, however, a special wrench for bell adjustments, a wrench for terminal nuts, a tube cutter, file, pair of long-nosed pliers, a wire skinner, knife, electrician's snips, rule preferably a five-foot "zig-zag"—chisel, brad awl, soldering iron, torch or plumber's furnace, and star drills for making holes in brick work or concrete.

For inside work it is well to have two screw drivers—one a long, thin "cabinet style," and the other a short one for use in close quarters or for assembling apparatus. A light "inside finish" or electrician's hammer, having a straight rather than a curved claw, is the one usually preferred, although some use a riveting hammer entirely. The pliers referred to are diagonal-cutting pliers and should be of the size known as "5-inch."

The bits required are: One ¼-inch twist drill, to be used as a "feeler" bit and for holes through which only one wire is to pass; one ⅜-inch twist drill for two-ply or three-ply wire; one ¾-inch "Irwin" or other make of wood bit for entrance holes. A bit known as the Syracuse or twist drill, ¾-inch, may be necessary for holes through walls where the drill comes in contact with nails, or through plaster. All bits should be 18 inches in length. This will insure their reaching through almost any ordinary wall or floor.

For outside work, in addition to the tools mentioned for inside work, will be needed a pair of large pliers, around 7 inches long, heavy hammer or hand axe, splicing clamp, lag wrench, large screw driver, spurs, tool belt and safety strap, slack tackle, tree trimmer, and a hand telephone or test set.

The list given includes about all a man will require in the majority of cases. There may be special installations which may require special tools and methods, but it is unnecessary for an installer to carry extra tools which he will not need. Get good tools. The old rule of quality instead of quantity applies here as elsewhere.

Telephone Company Employs Novel Waste Prevention Scheme.

As described in "The Telephone Bulletin," the plant department of the Southern New England Telephone Co. has a novel way of preventing waste and saving reclaimed material.

Five large bins—one each for the Installation Wire Chief, Cable, Line Gang A, and Line Gang B Departments—have been placed in one of the company's stockrooms, in New Haven, Conn., and into these every day the men of the various departments deposit materials which otherwise might be wasted. Between February 1 and May 1 of 1921, this reclaiming process resulted in a saving of $345.39.

Unique Method Employed for Eliminating Waste and Saving Reclaimed Material.

As the employes go around on their jobs, they pick up any telephone material found and odd pieces of wire. These articles lying about, such as protectors, knobs, are brought in and placed in the bins assigned to the different departments.

At the end of each month, the bins are emptied, separately, the material is sorted out, listed, recovered, and returned to stock. The saving for each department is then figured out and posted on a blackboard so that comparisons may be made between the savings of the departments.

Finding Position Where Hole for Wiring Is to Be Made.

In the placing of wire and boring holes to find the position in a basement where a hole must be made, the distance from two points that are common to both basement and the floor above, such as a chimney or a stairway are measured carefully.

If the lower floor is laid so that there is quite a bit of space between the boards, the "plate" of the wall can be easily seen and the whole operation is simplified. Then it is only necessary to find the approximate point along the wall where the hole is to be made. At this point the hole should be made with a ½-inch or ¾-inch wood bit, so that it will be large enough to make the "fishing" for the chain and string easy.

As the installer bores through the first thicknesses of the boards, the shavings should be watched carefully and if the bit travels in the hardwood of the upper floor, the shavings will give the clue and the installer can stop before boring entirely through the upper floor.

The Various Types of Telephone Receivers, and Uses.

There are several different types of magneto receivers, the classification being determined from the number or shape of the magnets used. The single pole, double pole or bi-polar, multipolar, and watch case receivers make up the classification of instruments in general use.

For many years the Bell company used the single-pole receiver, but after a certain time the single-bar magnet seemed to lose its magnetism. The bi-polar receiver, which employed the principle of a horseshoe or U-shaped magnet manufactured of two thin bar magnets bolted together at the end farthest from the diaphragm, was then used and was found to be much more sensitive and to retain its magnetism longer than the single-pole type.

The third type mentioned, the multipolar receiver, is not used to any great extent in this country and is for the most part of foreign make.

An exceedingly light instrument, weighing not more than five ounces, is known as the watch case receiver. It is used mostly for operators' head receivers and where light weight receivers are required.

Principles of Telephone Traffic

One of a Series of Articles Setting Forth the Fundamental Elementary Principles of Telephone Traffic Work—Every Operator and Manager Should Read These Articles — Method of Operating the Automatic Telephone

By E. L. Gaines

Traffic Superintendent, Home Telephone & Telegraph Co., Ft. Wayne, Ind.

The tendency to do nothing by hand that may be done by machine is responsible for a large portion of the industrial progress of recent years. Machines have been devised to do almost every kind of work, from digging trench for conduit and holes for telephone poles to weaving the covering on receiver cords; from unloading coal and ore from railway cars to making watches and laboratory instruments. Whether the work be done in the factory or office, in the street or field, the automatic labor-saving machine is found there lightening the burden of the toiler, speeding up the work and improving the product.

Spinning and weaving machines, typesetting and printing machines, automatic screw machines and hundreds of other devices, speedily turn out work of high quality and with such accuracy as cannot be equaled by hand labor.

The telephone, itself one of the greatest of labor savers, is made almost entirely by automatic machines.

Considering this trend of industry, it seems only natural that some effort should have been made toward eliminating the element of human labor from the task of rendering telephone service.

Nearly three decades ago a Kansas City undertaker named Strowger lost an important telephone call through an error of an operator. The incident started him thinking along the lines of an automatic telephone system and, although he was not an engineer, he evolved an idea, which is today the fundamental principle of automatic telephony.

Birth of Automatic Telephone.

Strowger devised means whereby the subscriber was enabled to select the line of the party he wanted to talk to and connect his line therewith by means of a switch-controlling mechanism located at his own telephone. Thus we have the birth of automatic machine-switching of telephone calls, and the progress in the art which has followed the first experiments of Strowger is in keeping with the general trend of industry toward labor-saving devices.

Strowger's efforts were crude and complicated insofar as they were expressed in mechanical design, but the fundamental principles involved were right and the principal installations of automatic telephone systems today are based on the original Strowger ideas.

The main idea in the mind of the inventor is to eliminate unnecessary work and the element of human slowness, uncertainty and error, and to reduce the cost of production. The success with which engineers have met in producing machines to bring about these results in the automatic telephone system is only limited by the telephone subscriber himself and local conditions in each plant which are beyond the engineers' control.

The idea of a mechanical telephone operator makes a favorable appeal to the average telephone subscriber who is too accustomed to blaming the human operator for all service failures, regardless of thetir nature. He now has an opportunity to control a machine that will do his own switching and, even though he may make as many errors as or more than the trained telephone operator, he readily excuses his own mistakes.

The Switch Control.

The switch control located at the subscriber's telephone, usually consists of an index dial having the numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, arranged around its periphery and a fixed stop located at the bottom of the dial. A movable dial containing ten holes is located above the face of the fixed dial. In operation the receiver is first taken from its hook; the subscriber inserts his finger in the hole corresponding to the number to be dialed, as indicated on the fixed dial, turning the dial as far as the stop will permit and then releasing.

This operation must be performed once for each of the digits in the desired number. The operation is simple and rapid; an average of about one second being required to dial each digit. The subscriber's time is occupied by dialing his number and he, therefore, does not notice the lapse of time as much as he would if required to wait the same length of time for an operator to answer.

Owing to the difficulty of remembering a number consisting of more than four digits, the first one or two digits of a five or six-digit number are usually indicated by letters or exchange names. Sometimes exchange names placed on the calling dial of the subscriber's telephone opposite the figures and in other cases the letters of the alphabet are placed on the calling dial together with figures in such a manner that the subscribers may dial either letters or figures.

With this arrangement, one or two letters of the exchange name are printed in heavy type or capitals and the subscriber dials these letters before dialing the number. For example, in calling MAin 4870 on a six-digit system the subscriber would dial MA 4870. In some cases where five or six digits are required in a number, the number is divided into groups of two and three or three and three digits as, 24-870 or 139-257.

The return movement of the dial, after being operated by the subscriber, sends a series of electrical impulses over the subscriber's line which actuates the electro-mechanical switches in the central office. After a connection has been established, an automatic ringing device rings the called party at regular intervals of a few seconds.

A buzzing tone, known as the revertive ringing tone, is thrown back on the calling subscriber's line each time the called party's bell is rung. The calling subscriber is thus informed automatically that his party is being rung and knows if he does not hear this tone that something is wrong and reports the matter to the complaint department.

When the called party answers, the ringing automatically stops as is also the case if the calling party abandons the call and hangs up his receiver. When through talking, the hanging up of the receiver instantly disconnects both parties.

If the line of the called subscriber is busy, the call cannot be completed as it is impossible to make the switches connect with a busy line. In such a case a busy tone, like the "busy back" in a manual trunking system, is automatically thrown on the line of the calling party who is thus informed that the called line is busy. The feature of absolute secrecy thus provided is in great favor with the telephone-using public.

Operating Party Lines Automatically.

Almost any kind of local service, and much long distance work, may be handled entirely without operators. Party-line service of almost any type or straight lines may be operated with equal facility. Party lines are operated automatically by arranging the switches in such a manner that the impulses from the operation of the dial for one digit in the number select the proper ringing current to be used. As many as ten parties on one line may be handled in this manner.

Code-ringing rural lines until recently were operated by having a ringing button on the telephone of the calling subscriber. After the line of the desired party had been dialed, the calling party would then ring the code ring of the subscriber

An Ideal of Service at a Lower Cost

Consider the Time Efficiency of Automatic Service

The answering time of the Automatic telephone is nil. A trunk is seized immediately the receiver is lifted.

The connecting time, that is the lapse of time from the lifting of the receiver to the ringing of the called bell or the return of the busy signal, is approximately 1 1/2 seconds per digit, where the dial is operated at normal speed.

The ringing time is naturally dependent largely upon conditions beyond the control of the operating company, but is as short as automatic, intermittent ringing can make it.

The disconnect time is approximately 1/2 second. A number of consecutive calls can be made with no noticeable delay between calls.

These elements of time efficiency are uniform and possible only with Automatic.

---And Automatic Service Costs You Less to Give.

AUTOMATIC EL

FACTORY AND GENERAL CE

BRANCH FICE

New York City 21 East 40th St. | Cleveland 415 Cuyahoga Bldg. | Philadelphia The Bourse Bldg. | Columbus 516 Ferris Bldg. | Bos 445 Trem

ASSOCIAT MPA

INTERNATIONAL TELEPHONE SALES GINE

International Automatic Telephone Company, Ltd., London — Compagnie Francaise pour l'Exploitation des Procédés T Hous

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

The Telephone of the Present and Future

Are You Planning to Install New Central Office Equipment?

Your earnest consideration of Strowger Automatic is invited. The experience of the past and the developments of the future in Automatic telephony are such that a company cannot insure its future prosperity without giving Automatic such consideration.

Have you a number of outlying exchanges that are sources of loss and embarrassment rather than revenue? The simplified C.A.X. switchboard is especially designed to meet and rectify such conditions.

Is your main exchange equipment nearing the end of its useful life? Strowger Automatic equipment for small main exchanges has been made as simple as adequate service requirements will permit, and its lowered cost places it easily within the financial reach of every company.

Our staff of field engineers is at your service, to make studies and estimates without cost or obligation to you.

All types of equipment promptly delivered.

CTRIC COMPANY

CES: CHICAGO, ILLINOIS

FICES:

Rochester, Mercantile Bldg. | Detroit, 525 Ford Bldg. | Pittsburgh, 608 Fulton Bldg. | Kansas City, 1001 New York Life Bldg.

MPANIES:

GINEERING CORPORATION, New York

Houston, Paris | Automatic Telephone Mfg. Co., Ltd., Liverpool | Automatic Telephones, Australasia, Ltd., Sydney

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

wanted by means of the calling button. This method is still used in offices where it is necessary to keep the central office equipment in its most simple form.

In a later method of handling code-ringing lines automatically, a code-ringing machine is provided in the automatic office and so arranged that the desired code is selected by the calling subscriber by means of the dial on his telephone in the same manner he selects the ringing current on a selective ringing party line This simplifies the calling operation for the subscriber, who is thus not required to know the code ring of the party he wants to talk to. Reverting calls, or calls for parties on the same line with the calling subscriber, are made by dialing the number and hanging up the receiver until the line is rung.

One of the most troublesome features of rural party lines is the practice of listening-in on the circuit by subscribers to conversations not intended for them. In magneto work this practice first caused serious trouble by interfering with the ringing. Local batteries were also quickly exhausted due to this practice. This trouble was overcome by inserting a small capacity condenser in series with the receiver.

Excessive battery losses were eliminated by providing a small latch above the switch hook so arranged that when the receiver was taken down, the transmitter and battery circuit was not completed until the hook was further released by the pressure of the subscriber's finger upon the latch. This arrangement allowed the subscriber to listen-in on a conversation without depleting the battery in his telephone and with a minimum amount of interference. This same device can be used to advantage on common battery circuits and is used in many instances on automatic rural lines.

(To be continued.)

Honoring America's Unknown Dead by Means of Telephony.

On November 11, when President Harding gave his funeral oration over the body of America's "unknown soldier" at the National Cemetery at Arlington, his voice, as well as every prayer and address uttered, was carried to thousands assembled in New York and San Francisco, over the Bell telephone company's transcontinental circuits. They were reproduced in the distant cities by means of its loud speaker apparatus.

On November 3, a test of the "wonder of communication" was made and the call of a bugle, the chime of bells, and the voice of a man was swept from San Francisco to Washington, with the result that every spoken syllable, every note of the bugle and every chime of the bells was as distinct as if it was sounding a hundred feet from the listeners.

During the test, when a voice announced to those in Washington, that the next words heard would be spoken in San Francisco, the faint whir of the mechanism rose to a higher hum and a new and deep voice announced that chimes, played on a phonograph record in San Francisco would come next. As clearly as if it were not a dozen feet away, the click of the phonograph mechanism came as the needle dropped on the whirling record disk 3,000 miles across the continent. A voice was again distinctly heard, reading a portion of President Harding's inaugural address, and then came the bugle call record more distinct than the notes of the bugles at Fort Myer, near where the Washington tests were being made.

Only the lack of equipment prevented the extension of the system to other cities of the United States. To accomplish the remarkable feat of communication, the Bell company employed nearly 10,000 miles of circuit, and double that length of wire. It had linemen stationed every 18 miles all the way to San Francisco, 308 picked men, to keep it all going. It had more than 90 telegraph operators on Morse circuits parralleling the talking lines to see that all moved smoothly and that orders were promptly obeyed.

Colonel Carty, head of the Bell system department of Development and Research, which developed the apparatus and brought it to its high state of perfection, was recently asked what he considered the most important feature of the loud speaker development. He said:

"The change that it is bound to create in the art of oratory. Heretofore orators have been chosen largely for their loud voices, their capacity to reach the ears of those at the back of the hall. We will make it possible for any ordinary man with common sense, possessing the average speaking voice, to get his thoughts into the minds of as many auditors as he may want to reach. Effective addresses by our plan can be made by men speaking no louder than a teacher speaks to his students in the classroom."

Thus the functioning of the "loud talking" system on Armistice Day marked an epoch in communication.

So in San Francisco, on Armistice Day, the civic auditorium and civic center were opened to the public and these places, where the audible features of the ceremonies at Arlington were transmitted, were the magnet for the city's massed observers.

In New York City, nearly 1,000 veterans, gold star mothers, a large delegation of wounded and crippled soldiers, representative of 300 American Legion Posts, veterans of the Grand Army of the Republic and other organizations and the general public took the 15,000 seats in Madison Square Garden long before the opening of the service. A great crowd gathered in front of the Garden and in Madison Square, where the powerful electric megaphones also trumpeted the President's address.

Voices and music arriving over the telephone were flung out from an amplifier about the size of an ordinary desk concealed behind flags on the speaker's platform. The sounds penetrated with uniform distinctness to the parts of the auditorium remote from the speakers' platform.

In the open air the President's voice, delivering his message, swept over the crowd in Madison Square as if coming from the chest of a giant, the sounds being heard more clearly than the voices of Colonel Theodore Roosevelt and Martin Littleton as they spoke from the platform in the Garden. Words strongly accented crossed the Square to Broadway in one direction, and to Twenty-third St. on the other.

George Whitefield, the 18th century evangelist, who is said to have been the possessor of the most powerful voice in history, was considered a marvel to have made himself heard at half the distance. Music of the ceremonies at Arlington—the crisp notes of the bugle, the playing of the band and the singing of the quartet—was carried to the Flatiron Bldg.

In addition to the President's address, the brief words of Admiral Beatty, Marshal Foch, General Diaz and other foreign soldiers, as they laid medals on the casket of the unknown soldier, came to the listening thousands.

Will Spread Sermons by Wireless Telephone from Pittsburgh.

For the first time in any Roman Catholic Church in the United States, a wireless telephone has been installed in the pulpit of Old St. Patrick's Church in Pittsburgh, Pa., during a mission given by the Paulist Fathers beginning November 25. The wireless is connected with the Westinghouse wireless telephone station, and the sermons go out every evening to all those who have wireless telphone receiving attachments.

For those who cannot come at night the sermons will be sent out so that they can be heard anywhere in the Pittsburgh district over the wireless telephones. For those who are to enter a church, but who wish some knowledge of religion in what may be called a neutral place, a series of noonday talks will be held, and they will also be spread broadcast.

Offer to Sell Company to Prove Losses in Operation.

When 200 Grundy county (Ill.) farmers met at Morris in an effort to obtain from the Illinois Bell Telephone Co. an agreement to reduce monthly telephone rates from $2.25 to $1.50, the company offered to sell the rural lines to the farmers and operate them through the Morris exchange. The offer was made, the company said, to prove the lines were being operated at a loss.

It's a Credit to the Community

"Fine Feathers Don't Make Fine Birds," but the Appearance and Construction of a Building Often Reflect the Importance of an Organization—The Holden Company Believes in Having a Building Worthy of its High Standing

The Holden Home Telephone Co. of Holden, Mo., is one of the companies that have recognized the necessity and wisdom of having a public office and exchange building indicative of its importance in the community. In point of capital invested, numbers employed and indispensability, this company ranks as the largest institution in Holden. It has recently erected a very attractive and convenient telephone building, a credit not only to the town and community, but to telephony in general.

The Bell Bell, Independent Shield and Kinlock "K" Appear on the Broad Windows.

The front is of white kellastone with three large plate glass windows with the door at the side. The windows are very handsomely lettered, the lower part being painted dark blue with the name of the company set in aluminum and with an aluminum hand at the top. In the center of the first window is painted the "Blue Bell," in the next the local and long distance red, white and blue shield, and in the other the red Kinloch "K," signifying the company's three long distance connections.

The main entrance opens into the public lobby with its pay-station booth, settee and local and long distance directories conveniently arranged. Separated from the lobby with birch-paneled counter and oxidized copper grill work is the general office, a very complete up-to-the-minute office equipped with addressograph for subscriber's billing, neostyle for printing circulars, inter-office blanks, etc., protectograph, adding machine, typewriters, desks, files, in short, all of the practical labor-saving devices.

A fireproof vault opening off the general office holds the books and records of the company; also opening from the general office is the director's room, separated from the office by birch and Florentine glass panelling. This room is furnished with a directors' table and chairs.

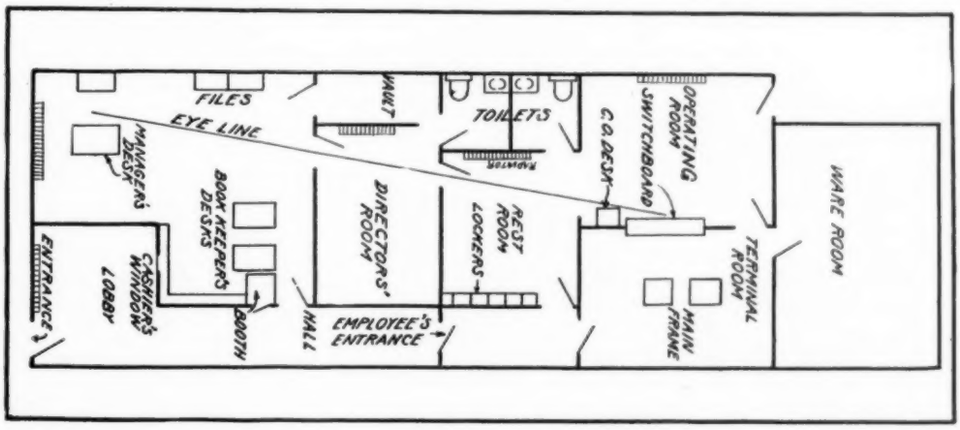
The locker and restroom, operating room, terminal room and shop open into a hallway at the end of the lobby. This hallway opens into the lobby through a door with an electric lock controlled by a push button on the switchboard and also by one located on the manager's desk. This door can be opened from the inside without the aid of the push button, but it cannot be opened from the lobby.

It is designed to keep the public from intruding, yet making it possible for the operators coming on duty to enter without any of those on duty leaving the switchboard. The incoming operator simply steps into the booth and asks to be allowed to enter. The operator presses the button and the door opens.

These rooms are also connected with the general office by a door opening from the directors' room. The doors are so arranged that when the manager sits at his desk he can see the whole operating force—and yet the doors are so arranged that the public cannot see into the operating room. This is one of the fine points thought out by Manager M. L. Golladay, who designed the building. He calls it his "eye-line" and to it is attributable the high-class service rendered by his company. He believes—and rightly too—that relentless supervision is the big secret of real success in the telephone business.

To obtain the necessary quiet in the operating room, the partition between the general office, directors' room and lobby, and the operating rooms goes to the ceiling but abundant light and ventilation are provided by transoms at both the front and rear of the building and transoms reaching to the ceiling over the doors in the partition. These transoms are all raised to the ceiling by means of pulleys, making an exceedingly cool and well-ventilated building.

The building has concrete floors, two toilets with hot and cold water, and is heated with an Arcola hot-water heating system. There is a large stone wareroom in the rear.



The Office Is Designed for Efficiency and Service—Note the Eye-Line to the Operating Room.

Vast Quantities of Timber Used in Telephone Plant.

Vast quantities of timber products are consumed every year by the Bell telephone system in new construction and in maintaining the plant required for its telephone lines. The annual requirements of the different classes are as follows:

Telephone poles, northern cedar	500,000
Telephone poles, chestnut	200,000
Telephone poles, creosoted pine	85,000
Cross arms, fir	500,000
Cross arms, creosoted pine	500,000
Locust pins	8,000,000
Creosoted conduit, linear feet	1,650,000
Creosoted wood plank, linear feet	650,000
Raw lumber for cabinet work cable reels and packing boxes board feet	12,000,000

Receiver Named for Garrett County (Md.) Telephone Co.

According to newspaper reports, a receiver has been named for the Garrett County Telephone Co., of Hoyes, Md. The bill for the receivership is said to have been uncontested by the company, which has been in active operation in many parts of the county for upwards of 20 years.

The lines of the company cover over 100 miles and extend to Addison and Confluence, Pa.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

1166. What form of ringing control is embodied in the connector equipment shown schematically in Fig. 322? Explain your understanding of the term "machine ringing." Referring to the chapter on "The Character of Telephone Traffic," what is the usual distinction drawn between the terms "machine ringing" and "automatic ringing"? In machine ringing such as that used in the equipment shown in Fig. 322, is the ringing current dispatched to the called line circuit constantly or intermittently? In the type of ringing control being described, does the removal of the called telephone receiver from its hook during the "ringing period" instantaneously interrupt the flow of ringing current?

1167. By the operation of which relay in the circuit shown in Fig. 322 is a circuit established through which current may pass in the winding of ringing control relay magnet *J*? Trace this circuit. What important common connection is not shown in Fig. 322 leading from slow-acting relay *G* ultimately to the positive or grounded terminal of the common battery? What equipment is included in this important common connection?

1168. Explain how ringing control relay magnet *J* operates normally-open contacts 1 to 8 inclusive. When the circuit is established which permits energizing current to flow in the winding of ringing control magnet *J* and the common battery, how is this circuit interrupted and what is the effect of such an interruption upon contacts 1 to 8 inclusive? Name three of the normally-open contacts 1 to 8 that are simultaneously closed when ringing control relay magnet *J* is intermittently energized. Explain how the common contact reached by wiper *T* is incorrectly drawn in the figure. Trace the path taken by ringing current when wiper *T* is resting upon one of the contacts in the first half of its associated bank. How will the circuit just traced be modified if wiper *T* rest upon a contact at the second half of its associate bank? Can you point out the relay in Fig. 322 which is operated as the result of the removal of the called telephone receiver during the silent period?

1169. What is the function of normally-open make contact 6? What is the relation between normally-open make contact 6 and the condenser *E*? What is the term employed for the condition established by the operation of normally-open contact 6? Does normally-open contact 6 become operative when the called line circuit is busy? To what does the arrow-head leading from normally-open contact 6, in the drawing lead? Is condenser *E* employed for a somewhat similar purpose when the calling telephone line is busy? What, in your opinion, is the value of the "ring back"? How can the release of the various contact operations brought about through the intermittent energization of ringing-control relay magnet *J* be modified?

1170. When the ringing current is required to pass through the called line over the ring conductor instead of the tip conductor, such as would be the case in calling certain parties on an 8-party selective party line circuit, how are the wipers *T*, *U* and *V* located as compared with the conditions just described? Trace the circuit followed by the ringing current under such a condition. What is the term employed for this system of selective ringing?

CHAPTER XXXIII. Operating Combinations Including Switching (Continued).

1171. *Duration of ringing of called telephone bell.*—While it has been found that the employment of machine ringing, such as that described in connection with the circuit shown in Fig. 322, materially reduces the average answering time of the called subscriber on all connections, it is evident that provision must be made so that the ringing of the called telephone bell will continue until one of three conditions has been brought about. These conditions in the order of their relative importance are as follows:

Intermittent flow of ringing current must be discontinued when the called party answers during a "silent period."

Intermittent flow of ringing current must be interrupted when the called party has not answered but the calling party has replaced his receiver upon its hook.

Intermittent flow of ringing current must be interrupted when the called party has removed his receiver, inadvertently, during a ringing period and has awaited the succeeding silent period in readiness to receive the call.

1172. *The completed connection.*—It is obvious that the first of these conditions is the normal condition and should result in the establishment of a completed talking circuit between the connected telephone stations. The establishment of such a talking circuit requires provision for supplying operating current to the two connected transmitters, one at each station, as well as a path between the two stations which is conductive for telephonic voice carrying currents.

Assuming, therefore, that the called subscriber has been summoned to the telephone by the intermittent ringing of the bell and has removed his telephone receiver, in readiness to talk, during one of the silent periods, the conditions which will be brought about as a result of the removal of his receiver during a silent period are as follows:

A circuit will be established through which current will pass in the winding of relay *A* which is traceable as follows:

Starting at the positive or grounded terminal of the common battery, the current will flow through the winding of impedance coil *C*, normally-open ringing control relay contact 1 (now closed), normally-closed break contact of relay *Z*, line-switch wiper 2, the called line tip bank contact on which it is resting, the tip conductor of the called line circuit, the called telephone instrument, the ring conductor of the called line circuit, the called line circuit ring bank contact, talking circuit wiper 3 resting thereon, the normally-closed break contact of relay *Z*, the normally-open ringing control relay contact 2 (now closed), the winding of relay *A* and the common battery.

As a result of this flow of current, relay *A* is operated and, by the operation of its normally-open make contact, completes the ring conductor of the trunk circuit between connecting stations. It will be remembered that relay *B* has previously been operated at the same time as the cut-off relay *A*, Fig. 319, of the calling line circuit, thereby completing the circuit through the tip conductor of the trunk except for the normally-open make contact 1 of the ringing control relay.

The operation of relay *A*, resulting from the removal of the called telephone receiver from its hook also interrupts the circuit through which holding current has been flowing in the winding of slow-

acting relay *G*. This releases slow-acting relay *G* and restores to normal the conditions for which the continued operation of relay *G* is necessary. In passing, it is worthy of note that normally-open ringing-control relay contact 7, when closed, will supply a ground or positive battery terminal connection instead of the one obtained through the intermediate switch test-bank contacts 8 and 9 and the intermediate selector equipment.

Under conditions in which the ringing control relay normally-open make contact 7 has not been operated, the release of the intermediate selector switch will not result in the immediate release of slow-acting relay *G*, Fig. 322. Slow-acting relay *G*, owing to its construction, will not instantaneously release its armature when the flow of current through its winding is interrupted. For that reason its normally-open make contact will remain closed for a short period of time after the operation of relay *A*. This condition is covered by the looping of the normally-open make contact circuit of slow-acting relay *G*, the restoration to normal of which is deferred, through the normally-closed break contact circuit of relay *A*.

By this means, the operation of relay *A* instantaneously interrupts the circuit through which energizing current is passed to the winding of ringing-control relay magnet *J* and this same circuit is subsequently interrupted and controlled at another point by the deferred release of the armature of slow-acting relay *G*.

The effect then of the operation of relay *A* is to release slow-acting relay *G* and to interrupt the circuit controlling the operation of ringing control relay magnet *J*.

1173. *The line discharge.*—In the use of machine ringing it is necessary that the electrostatic charge, which would remain after the ringing period in the line and telephone condenser, unless the ringing current happens to be interrupted at the instant of zero voltage, must be reduced in order that operation of the telephone ringers at a subsequent ringing period may be assured. In other words, unless the line is freed of an accumulated charge after each ringing period, the re-establishment of the ringing circuit, in a subsequent ringing period will be affected by a line charge in a certain proportion of the total number of ringing periods and such line charge will tend to prevent the satisfactory operation of the telephone ringers.

This is due to the fact that some of the energy of the ringing current impressed on the circuit, in such cases, is required to neutralize the line charge and is unavailable for the operation of the ringers. Normally-open ringing-control magnet contact 5, therefore, is arranged so as to be closed immediately after the interruption of the ringing circuit through normally-open contacts 3 and 4. It will be noted that normally-open ringing-control relay contact 5 connects the ring side of the called circuit with the negative or non-grounded terminal of the common battery through a suitable resistance.

The period during which this contact is closed is fixed to permit of the equalization of the charge remaining in the called line circuit and its connecting condensers with the normal voltage of the common battery. In this way, the next operation of the ringing control contacts, 3 and 4, will permit current to pass to the called line circuit free from varying possible conditions created by a line charge of voltage different from that afforded by the common battery under normal conditions.

(*To be continued.*)

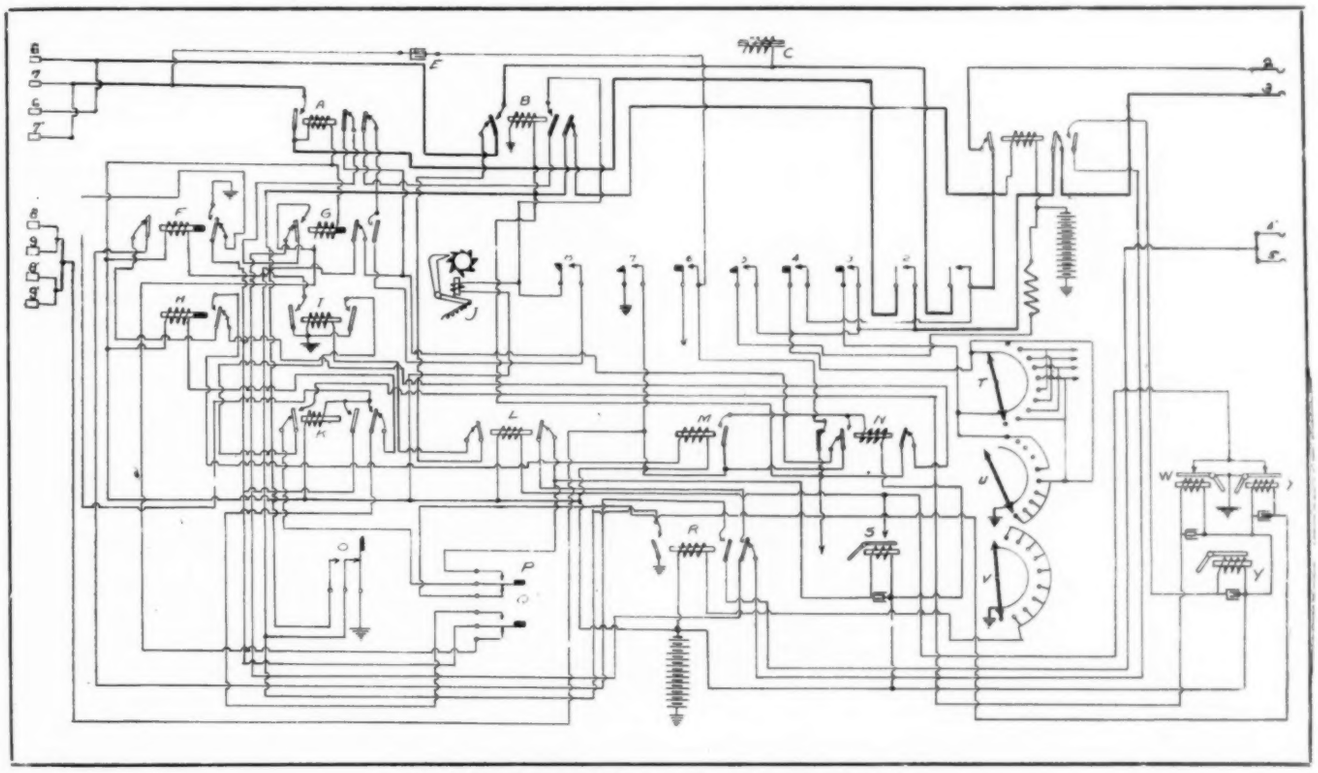


Fig. 322. Wiring of Connector Switch Equipment.

Pennsylvania Convention at Harrisburg January 12-14.

Thursday, Friday, and Saturday, January 12, 13 and 14, 1922 are the dates selected by the Pennsylvania State Telephone & Traffic Association for holding its next annual convention. Headquarters of the meeting will be at the Penn-Harris Hotel at Harrisburg.

It is unnecessary to remind those attending the 1921 convention of the Pennsylvania association of its success. This year the association hopes for even a better meeting. The interest already shown by the manufacturers, says President Bradley, assures a line of exhibits which the operating man cannot afford to miss.

Telephone men are urged to begin now to plan to attend the convention and to invite their neighboring companies. The association especially requests that those companies who are not members be present.

The program, upon which officers of the association are now at work, is to deal principally with the problems of management, and the committee in charge would welcome suggestions as to the subjects to be discussed.

Personal and Biographical Notes

Frank S. Morsman, general traffic engineer of the Northwestern Bell Telephone Co. at Omaha, has been made general toll supervisor in the office of general superintendent of traffic, a new department. He has been with the traffic department for 16 years. He is succeeded as traffic engineer by Carroll B. Spring, of Minneapolis, who has been in the business since 1892, and has the unusual record of not having a single day's official absence marked against him. Frank V. Rhodes, chief clerk to the general traffic superintendent, has been made machine-switching service inspector, a new position created because of the growth of automatic equipment in Bell exchanges. He is succeeded as chief clerk by L. D. Brobeil, formerly general traffic accountant.

Bert Shigley, of Greenfield, Iowa, has been engaged as manager of the Lincoln Mutual Telephone Co. of that city. Mr. Shigley was formerly owner of the Pioneer Storage Battery Co., of Greenfield, but before entering the storage battery business, he was engaged in the telephone field for over 20 years, so that he should be well qualified to successfully manage the Lincoln company's exchange.

A. G. Bergen has resigned his position as manager of the Highland County Telephone Co. at Hillsboro, Ohio. Mr. Bergen went to Hillsboro about a year ago and assumed charge of the company at a time when the mechanical department was in a very disorganized state and the consolidation of the two old exchanges was imminent.

Since then, although working under very trying conditions, Mr. Bergen has produced excellent results for the Highland County company. In fact, although it is said that telephone service in Hillsboro is not what the subscribers would like to have it, yet telephone experts claim it is among the best in the state.

Harry G. Mulbarger, a special agent and salesman in the commercial department of the Tri-State Telephone & Telegraph Co., St. Paul, Minn., since June, 1917, has been transferred to Rochester, Minn., as local commercial manager of the Rochester Telephone Co. T. C. Considine, who has been manager at Rochester for several years was compelled to resign, effective November 1, on account of ill health.

Mr. Mulbarger has had continuous telephone experience since 1915 with the single exception of a war-time period when he served in Uncle Sam's navy. In that year he was employed as salesman at Columbus, Ohio by the Ohio State Telephone Co. In the order named, he performed similar service for the same company at Youngstown, Alliance and Cleveland, leaving the latter city in December, 1916, to go with the Home Telephone Co. at Jacksonville, Fla.

He later was transferred to Indianapolis, Ind., and from there went to St. Paul to join the commercial staff of the Tri-State company. In December, 1917, he enlisted in the United States navy, serving 13 months.

At the time of his transfer to Rochester

Harry G. Mulbarger, New Local Commercial Manager of the Rochester Telephone Co. at Rochester, Minn., Has Had Broad Experience in Telephone Work.

Mr. Mulbarger was a Tri-State special commercial agent. His work in St. Paul was regarded by his associates as extremely satisfactory and his many friends in that organization, while pleased at his progress, regret the loss of his kindly counsel and pleasant personality.

Sherwood Hough, who resigned as purchasing agent for the Tri-State Telephone & Telegraph Co., St. Paul, Minn., effective June 30, 1921, after 16 years of continuous service in that department, is back in telephone harness again. After trying his hand in one or two other lines of work, the lure of the old game became so strong that he decided to accept a position as special agent in the office of Rollo R. Stevens, general commercial superintendent.

H. M. Cowan, manager of the Chanute, Kans., exchange of the Southwestern Bell Telephone Co. for the past year and a half, has been promoted to the managership of the Winfield exchange. Mr. Cowan had charge of the Chanute exchange since late in March of last year, going from Iola to succeed W. C. Penfield when the latter was made manager of the Coffeyville district.

H. I. Dodson has been made chief engineer of the Northwestern Bell Telephone Co. at Omaha, Neb., in the place of R. A. Gantt, who is now acting superintendent of plant, succeeding R. A. Walker, resigned.

J. C. Schilling of East St. Louis, Ill., has been selected by the Kinloch Long Distance Telephone Co. to succeed L. J. Cremen, who recently resigned his position as manager of the exchange at Granite City, Ill. He has been with the Kinloch company for the past 22 years.

E. S. Sterrett, of Henry, Ill., president of the Sullivan Home Telephone Co., is recovering from injuries received recently when the car in which he and his wife were riding upset on a road near Clinton.

W. E. Moler, secretary-treasurer of the Athens County Home Telephone Co., of Athens, Ohio, is wintering in the sunny state of California. His headquarters during his stay there are at Pasadena.

H. C. Johnson has been made manager of the Local Telephone Co. with headquarters at Norwalk, Ohio.

Curtis H. Rottger, of Indianapolis, was elected president of the Indiana Bell Telephone Co. at the quarterly meeting of the board of directors in Indianapolis, October 27. He succeeds Edgar S. Bloom, who was elected chairman of the board of directors. Frank Wampler continues as vice-president and general manager of the company.

The new president of the Indiana Bell Telephone Co. began his career as a night operator and switchboard man in 1882, attending school during the day. His first position was with the Central Union Telephone Co.

During his 39 years in the business, he has held positions in all departments. He was exchange manager in Muncie in 1896.

Mr. Rottger was recently elected vice-president of the Telephone Pioneers of America at the annual convention of the organization in St. Louis, Mo.

Rufus Stark has resigned his position as manager of the Cumberland Telephone & Telegraph Co., at Elizabethtown, Ky., and assumed the managership of the company's Pewee Valley exchange.

Stanley Hayes of Bowling Green, has taken charge at Elizabethtown.

M. B. Harwood, formerly with the Illinois Bell Telephone Co., of Chicago, has accepted a position as manager of the Murphysboro Telephone Co.'s Herrin, Ill., exchange. Mr. Harwood succeeds M. T. Brown.

Bloomfield, Neb., Strike Near End!

Subscribers' Strike of Eight Months' Duration Against Increased Rates Authorized by State Commission Nears End—Commission to Hold Hearing on Company's Application to Determine and Fix Rates It Deems Fair and Reasonable

The preliminary steps for ending the "strike" of telephone patrons at Bloomfield, Neb., which has excited wide interest, were taken by the Union company of Wausa, which owns the exchange there, when it applied to the state railway commission asking that it come to Bloomfield, investigate and examine into the facts, and then determine, estimate, approve and fix what it then deems to be fair and reasonable rates.

The company entirely reconstructed its exchange at Bloomfield during 1920, and then made application for an increase in rates of 25 cents a month on each class of service, having changed from grounded to metallic. On February 28, 1921, the commission, after a full hearing, granted the request, and fixed a temporary schedule of rates to go into effect on April 1, and to expire December 31, 1921.

Immediately there was a flareup at Bloomfield, and as the result of several meetings of protest, everybody agreed to quit the service on the night of March 31, unless the company would continue to give service at the old rates. It declined to do so because it meant below cost of operation. At the time agreed upon, nearly every one of the 680 subscribers, farmers, business men and townsfolk did their own disconnecting, following the instructions of a lineman who had been employed to tell them how to make sure everybody would stick to the agreement.

The exchange was left with but 12 subscribers, and as the state commission stood behind the company, it settled down into a struggle. At one time, a month or two ago, the strike was on the point of breaking down, but while the company got back 70 of the subscribers, the local leaders halted negotiations by harking back to a claim that the company had broken a pledge to the city council, when the franchise was secured or renewed, not to increase rates.

The company also asks that at the time the commission holds its hearing, which has been fixed for December 12 at Bloomfield, it ascertain what will be proper rates for metallic service at Crofton and Wausa, which will be converted as soon as possible from grounded exchanges.

The strike has been prolonged beyond what would ordinarily have been true by reason of the fact that the rates were to expire by limitation at the end of the year. During the last few months the strikers have been urged to hold on by declarations in the local newspaper that the company would not dare ask for a renewal of the objectionable rates, and intimations that if it did not, the commission would reinstate the old ones, and the fight would have been won.

The company cleverly evaded the issue by asking the commission to fix just and reasonable rates only, naming none itself. The commission is game to take up the gauntlet, and has sent out notices asking everybody to come to the hearing and have a showdown all around.

Reports that reach Lincoln indicate that the strikers are looking for a way out and this will afford them the opportunity. The most significant fact is that the company is to be represented in the hearing by County Attorney Peterson as its attorney, and being in politics he would not be toying with the dynamite that would be present if the strikers were not ready to quit.

The company submitted figures showing that at the Bloomfield exchange, for the first three months of the year, under the old rates, it lost $570, revenues being $3,742.80 and expenses $4,312.94. In seven months of the strike, its revenues were $1,092.97 and its expenses $7,057.36. The loss at Bloomfield for the entire ten months was $6,531, and as the new rates did not meet expenses at Wausa the company has lost $6,379.71 on the entire business. These figures do not include any computation for dividends for the period.

The outcome has been indicated for some time. Business men were getting rather tired of the losses they felt they were sustaining through their inability to have quick communications with their trade—and they didn't like the reputation the town was getting in the state. At the bottom, the strike was not against an unjust or unfair rate, but one that the patrons didn't want to pay. In other words, they were starring in the role of business men who were not willing to pay what a commission created by the public had said was a reasonable and just rate—a commission whose decrees and judgment had been accepted by every other city in the state where rates had been advanced.

The company, sensing the change in feeling among the farmers, sent out a number of solicitors in August to get them to sign up again for the service. Almost invariably the reply was that they had agreed with the business men not to take any such step without previous warning, but they suggested that if the company desired to connect them up again without their having to sign anything, they were willing. The business men stood pat and refused to re-connect, and the farmers decided service without city connections was not worth while.

For exactly eight months, the town, which numbers 1,600 persons, has been without exchange service, and in June long distance service was also cut off by the closing of the exchange, to which about 30 of its 680 patrons had remained loyal.

A year ago the announcement of the company that it proposed to rebuild the exchange, substitute full metallic service for grounded, build a new exchange, and place three miles of the wire underground was received with joy. The company went ahead and invested $30,000, and then applied for an increased schedule of rates. It was granted $2.50 for business and $1.50 for residence, which would have increased revenues about 23 per cent, but which, as found by the commission, would not give a reasonable return on the actual investment.

The raise came at an unfortunate time for the company. The banks were hard up and pushing the merchants and farmers on their loans, local business men were taking losses on stocks of goods with the market going down and farmers were selling wheat and corn and stock at a big loss. Not knowing or caring that the company had been restricted in its rates during the war while they were all making big profits, they were easily stampeded by some local business men into demanding that the company take a loss along with them, and continue to furnish the new service at the old rates.

They declared they would all order out their telephones if the schedule was insisted on. The state commission told the company that the new rates were legal rates, and that they knew of no reason why they should be reduced after the company had made the showing it did. This left the company without any basis upon which to bargain, if it had been seriously inclined to do so.

Flushed with success, the patrons' association laid down the ultimatum, within a few weeks after the strike began, that the company would be given a stated period to reopen at the old rates or steps would be taken to build a home exchange. The Bloomfield exchange is owned by the Union Telephone Co. of Wausa. It was also a part of the new demand that free service be given to the county seat. The company sat tight.

The investigators discovered that to build an exchange sufficient to give the

necessary service would cost so much more than the valuation placed on the Union plant that it would have to charge even higher rates than the new schedule. Then there was an effort made to buy the property by local subscriptions of capital. This fell through because of the tightness of money and the fear that maybe the Union company schedule was right and that it would have to be charged by the new company if it was to buy.

All the time there had been sinister whisperings that either the commission was on the side of capitalists or that the company was able to juggle its books in some way as to deceive the commission into believing more money had been invested than was really true. An Omaha attorney who had had experience in cases before the commission, was called in. His advice was that, if the people believed there was any basis for their suspicion that the company had hidden out on the commission, an accountant be employed. A meeting to consider this was called, but when it was found that this would cost at least $500, it was dropped, and subscribers began talking about how to get telephone service started again.

Two things were urged by them in justification of their strike. One was that the company had agreed not to increase rates when the ordinance permitting reconstruction was passed, and the other than the company ought to take a loss for a time as all others were doing. The commission said state regulation removes all binding force from ordinances and rendered unsound the second argument.

Commissions, Courts and Councils

Discussion and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Fixes Value of Property and Allows 8 Per Cent On It.

The Nebraska State Railway Commission has issued an order fixing the value of the property of the Pawnee Telephone Co., operating at Pawnee City, at $61,219.56, and dividends of 8 per cent are expressly limited on that figure. Any deficit in revenue preventing the company from paying such dividends will be cared for by a further order of the commission, and any surplus that may remain after the payment of all expenses, taxes and dividends will be treated as in previous orders.

No order will be entered now respecting the increase in rates asked by the company, but after the filing of its 1921 report, the applicant will be permitted to make a further showing in case dividends are not earned.

The commission had once before passed on the valuation of this company, but on its vigorous protest allowed a rehearing. In the order just issued, it is pointed out that in its evidence the company claims a valuation of $85,519.66 and in its brief figures it at $111,026. Such variation, it says, is sufficient to warn the commission that great reliance cannot be placed upon any of the figures offered, and that it should be guided rather by the physical valuation than by the company records.

The commission holds that the claim that the salary of Mr. Becker, the manager, was not paid until 1916 is not tenable, and sticks to its original statement that down to 1907 the actual investment did not exceed $26,063. The variance between that figure and the one claimed for the company is explained by the fact that the depreciation reserve was used for new construction, thus adding to the value of the property but not to the investment by stockholders.

The commission refuses to allow a reduction in the items of depreciation and maintenance from 9 per cent to 8 per cent. A well-constructed system will not require repairs immediately, but to say that depreciation is not taking place is to deny all experience. Depreciation in value results from the deterioration of the property due to age and use and is not dependent on the time at which repairs are made except that the longer they are deferred, the more rapidly the property deterioriates.

The commission upholds the contention of the company that certain items were too greatly depreciated, and adds $2,000 to what was previously allowed. It also says the claim that working capital was not figured is well-taken. It allows $1,500 for this purpose, and tells the company that it permits too large an accrual of rentals and is losing money because of this. The commission also allows $2,000 to the going concern value previously computed. It is impossible to measure accurately, but its existance is recognized in law and must be regarded as an element of value.

The total additions allowed are $6,042, which means over $400 a year more revenue. The commission says it does not believe an addition to rates should be allowed at the present time, but that the company should endeavor to reduce its expenses sufficiently to cover that amount. Some of the items of expense are regarded as rather large, and it is suggested the reduction possible in these would cover the revenue necessities without adding to the rates. It is also suggested that the falling prices of materials and supplies will assist in this.

Emerson Mutual (Iowa) Company Gets Exclusive Franchise.

Citizens of Emerson, Iowa, voted recently to grant an exclusive franchise to the Emerson Mutual Telephone Co. of that city.

The Emerson company, which has lines serving a number of farms in Emerson territory, has also asked for a franchise to use the streets and alleys of the city for poles and wire, and to establish an exchange office. A vote is to be taken on the granting of this franchise in the near future.

Plan Exchange in Evansville, Ind., to Serve Physicians.

The establishment of a "physicians' and surgeons' telephone exchange" in Evansville, Ind., will be perfected shortly, according to a recent announcement by the president of the Vanderburgh County Medical Society of that city.

The purpose of this exchange is to protect the members from loss of any calls when their telephones are unattended. It will be the duty of the operator of the exchange to locate the doctor being called and to secure all information as to clubs and theaters frequented by the doctor. If the member's telephone is out of order, he will be notified by special messenger.

A fee of $3.25 per month is to be charged the physicians for membership.

Argue Louisville (Ky.) Rate Case in Court of Appeals.

Questions involved in the rate controversy between the city of Louisville, Ky., and the Louisville Home Telephone Co. were argued on November 16 before the Federal Circuit Court of Appeals at Cincinnati, Ohio. The city is seeking to have annulled the injunction by which it is stopped temporarily from interfering with the schedule of service charges the telephone company has established.

In its arguments, the city contended that the act of 1904 which compels it to sell a new franchise whenever one expires, is unconstitutional. It based its argument on a provision of the constitution which vested in the various municipalities of the state the discretion to grant, or not to grant, a franchise. This pro-

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vision, it argued, was beyond legislative interference, and the legislature had no right or authority to pass an act compelling the city to grant a franchise when one expired.

The telephone company contends that the rates for service which the city is attempting to establish allow only a small return on its investment, the valuation of which is placed at aproximately $5,000,000.

The litigation grew out of an effort by the telephone company to secure a rate of approximately 33 per cent increase over the rate charged for telephone service under the franchise which expired on March 7, 1921.

At the expiration of the franchise the city passed an ordinance granting the use of the streets to the company for another year and fixing a rate of about 23 per cent increase.

The company was not satisfied with this increase and brought suit in the federal court on May 28 to enjoin the city from enforcing the ordinance rates and asked for a rate 10 per cent in excess of the ordinance rate. Judge Walter Evans granted the injunction and allowed the rate asked by the company.

Directors Have Right to Prevent Sale of Telephone Stock.

An interesting decision handed down recently by the North Carolina Supreme Court is that in the case of "Wright vs. Iredell Telephone Co., of Statesville." As a result of this decision, the contention of the telephone company that its directors have the right to prevent stock sales is upheld.

The Iredell company was organized by Statesville citizens to oppose the Bell company and to protect the Independent company from the secret purchase of stock from individuals by hostile interests, H. P. Grier, who has been president of the company since its organization, wrote into the charter an inhibition against the sale or transfer of stock, except by the approval of the board of directors.

Mr. Wright, through his agents, purchased a number of shares of the stock, but when he applied for its transfer, the board of directors, believing that he sought control of the company, refused to make the transfer. He then brought suit to compel the transfer.

Hear Cumberland Rate Case in Mississippi Circuit Court.

At the hearing of the Cumberland Telephone & Telegraph Co. rate case in the Hinds County (Miss.) Circuit Court on November 18, motion was filed by the attorney general to require the state railroad commission to amend its return to the writ of certiorari and show what evidence it had, at the time the increase was granted, showing the relation between rates for local service and operating expenses of the company. Attorneys for the telephone company also filed a motion to annul the writ of certiorari.

Several months ago, counsel representing several commercial bodies of the state instituted proceedings to prevent the enforcement of an order of the state commission granting the company an increase of about 20 per cent in local rates.

The litigation is now in both the state and federal courts, the Cumberland company having secured an order from the federal court appointing a master to make an investigation and determine a reasonable rate. It is estimated that this investigation will take several months' time.

Rate Inadequate to Meet Expenses —Increase Granted.

Telephone rates charged by the Sacred Heart Telephone Co., at Sacred Heart, Minn., have not been sufficient to pay operating expenses and provide for depreciation of the property, no dividends being paid on the capital stock since 1919, so the State Railroad & Warehouse Commission authorized the company on October 27 to increase its rates, effective November 1. The old monthly rates compare with the new as follows:

Individual line business..	$2.00	2.50
Individual line residence..	1.00	1.50
Rural switching	.33⅓	.33⅓

Approximately 125 town stations are served by this company and 205 connecting company stations receive switching service at the Sacred Heart exchange.

Agreement Between Express and Telephone Company Approved.

In a decision handed down the fore part of this month, the Massachusetts Department of Public Utilities approved an agreement reached recently by express companies in and around Boston and the New England Telephone & Telegraph Co. Under its terms the telephone company will be relieved of maintaining a special branch to handle calls for express companies at its Richmond exchange for the convenience of about 200 merchants.

The new plan provides that the service will be furnished through a private branch exchange, maintained by a corporation to be managed by three trustees, representing the merchants, expressmen, and general express offices.

In its decision, the commission pointed out that the case is not to be considered a precedent to be followed, should a new group of subscribers in a different line of business apply for a similar type of service.

No Objections to Increase—Higher Schedule Approved.

Accompanying the application recently filed by the Southwestern Bell Telephone Co. with the Missouri Public Service Commission for authority to increase rates at its Morehouse exchange was a petition signed by a large number of subscribers asking that the rates asked for by the company be approved as soon as the plant had been rebuilt and other work done.

A letter was received by the commission sometime later from the city council of Morehouse stating that this work had been completed and met with their approval, that the service was very satisfactory, and recommending that the proposed schedule become effective for a temporary period. Exhibits presented by the company contained data showing that the revenues accruing from the old rates were inadequate and that the estimated returns from the proposed increase would not be excessive.

Accordingly, on October 26, the commission granted the company permission to raise its monthly rates as follows for a temporary period of 13 months, effective November 1:

Business.	Old.	New.
Individual lines	$2.00	$3.00
Extension sets	1.00	.75
Residence.		
Individual line	1.00	1.50
Extension sets	.50	.50
Desk equipment (additional).		.25
Rural Service.		
Business	1.50	2.00
Residence	1.50	1.50
Service Stations.		
Business	.50	1.00
Residence	.50	.50

Prefer Old Farm Rate and Poor Telephone Service.

Farmer patrons of the Monfoe Independent Telephone Co., of Nebraska, prefer to have poor service at a dollar a month rather than good service at $1.25 a month. That was the reason assigned by officers of the company when asked to appear before the state railway commission recently to explain why certain conditions of the order allowing an increase in farm and town rates had not been complied with. The threat of the commission was not to prosecute, but to rescind the order.

Complaint had come to the commission that the company had started in to collect the increased rates allowed by the order, but had not furnished any part of the additional service upon which the rates were conditioned. It was admitted by the officials that the increased rates had been put into effect in the towns, but that the additional operators needed for more prompt answers to calls had not been supplied.

The reasons given were accepted by the commission as justification. It was shown that in four of the towns where the company maintains exchanges, one or more individuals with grievances against either the officials personally or against the company had made it their business to go around and stir up feeling over the

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small increase in rates and to organize opposition to payment of any more than was being charged.

A meeting attended by several hundred was held at Albion, the largest town on the list, and petitions circulated against the increase. The objectors raised so much noise and claimed to have so many signers to their demand for the old rate being restored or no more service would be wanted that the company thought it the part of wisdom to wait and see if they were to have any exchanges left to man.

The farmers soon found out that they were being misled, that there had been no increase on their lines and would be none until certain reconstruction had been completed, and they dropped out of the fight. The company lost less than 50 telephones as a result of the threatened boycott, about what might have been expected in times of depression. It will proceed to add more operators to the town exchanges where needed, secure in the belief that the row is all over.

With the farmers unwilling to spend another cent for service and content to pay the old rate for the old and poor service, the commission ruled that whether the company did the reconstruction work ordered, and whether the added farm rates ever got into effect, depends upon the officials and the farmers. It had sought to insure that the farmers get a better grade of service by requiring the company to furnish it and to see that the company got proper rates by giving it an increase, but if neither desired to improve the situation, it would allow the whole matter of farm rates and reconstruction to ride for the time being.

Illinois Bell Restrained from Raising Rates in Peoria, Ill.

The city of Peoria, Ill., on November 28, was successful in preventing the Illinois Bell Telephone Co. from putting into effect increased rates when Judge J. M. Niehaus, T. N. Green and C. V. Miles, sitting en banc for the Peoria Circuit Court, denied the company's motion to dissolve a temporary restraining injunction granted by Judge Green on November 1.

Threaten to "Tear Telephones from Wall" If Rates are Raised.

A threat to "tear their telephones from their walls" if the increased rates announced by the Kansas Telephone Co. for Lawrence, Kans. and the surrounding rural territory are placed in effect was made by about 250 farmers of Douglas County at a mass meeting held in Lawrence November 26, according to newspaper reports.

The meeting resulted in the drawing up of a petition to be presented to the state public utilities commission which asks the commission to prevent the telephone company from establishing the proposed increased schedule and further asks the co-operation of the city in the fight against the higher rates.

The rates to which the farmers object are 25 cents per month higher than the old ones. Although the company announced the rates effective as of December 1, it was understood that the rural rates would not become effective until January 1, inasmuch as most of the rural telephones are paid for quarterly and the next period of payment does not fall in most cases until the first of the year.

This local telephone "fight" has extended over some months, originally being between the city and the company. An injunction against the public utilities commission interfering with the rate-making of the company and authorizing a schedule of rates which the company should consider fair was granted the telephone company by the Kansas District Court recently. The injunction was granted after the city had obtained a ruling from the commission allowing the company only a small part of the increase asked for.

Stock Issue Authorized of $12,000 Less Than Asked.

Instead of the $50,000 worth of stock that the Beaver City Telephone Co. desired to issue, it must be content with $38,000, the Nebraska state railway commission so orders. Until some time ago, the telephone plant at Beaver City was owned equally by A. Gaddis and W. F. Ellis, who devoted their time and energies to the business. A little while ago they had an opportunity to buy the exchange at Edison, near by. This cost $12,000 and was worth $10,000. The partners purchased it for $6,500, and then proceeded to incorporate the company with $100,000 capital and owning both exchanges.

The consent of the commission was necessary before any stock could be issued, and this made a valuation necessary. The commission had valued the plant back in 1916. At that time the book value was $40,872, but it was in 60 per cent condition so the commission placed the value at $25,000. In bringing these figures up to date, the commission allowed an addition of $5,000 for dividends earned and put back into the property, making $30,000 for the Beaver City exchange. It allowed $8,000 for the exchange at Edison, upon which the new owners have spent $1,500.

The Beaver City exchange serves 600 subscribers and that at Edison 200. The owners value the first exchange at $40,000 and the second at $10,000, but the commission refused to allow these figures.

Compromise on Telephone Rates for Dallas, Texas.

Ending litigation of more than a year's duration, which was at length carried to the United States Supreme Court, city commissioners of Dallas, Texas, and officials of the Dallas Telephone Co. have compromised their differences.

The new rates are effective as of November 1. The chief changes are the reductions in the rate for unlimited service on one-party business telephones from $10 to $9, and from $8.50 to $7 on two-party lines. The rate on unlimited service on one-party residence telephones remains $4, but two-party residence telephones have been reduced from $3.50 to $3. Provision is also made for measured service, the minimum charge for a one-party line being $3, but this will not be effective until all manual telephones have been changed to automatic and measuring facilities installed.

The new rate schedule is as follows:

Business:
Unlimited Service—One-party line station, $9; two-party line station, $7; extension station, $1.50.
Measured Service—One-party line station, $6 (message allowance 100, additional messages 4 cents each); extension stations, $1.
Semi-Public Service—One-party line station, guarantee per day, 15 cents; local messages, each, under guarantee, 5 cents; local messages, each, over guarantee, 3¾ cents; extension stations, with coin collectors, $1.50; without coin collectors, $1.
Joint User—One-party line, unlimited, $2; one-party line, measured, $1; private exchange, $2.50.
Extra directory listing, 25 cents.
Residence:
Unlimited Service—One-party line station, $4; two-party line station, $3; extension station, special wall set, 75 cents; desk set, $1.
Measured Service—One-party line station (minimum charge) $3 (message allowance 75, additional messages 3 cents each).
Joint User—One-party line, unlimited, $1; one-party line, measured, 50 cents.
Extra directory listing, 25 cents.

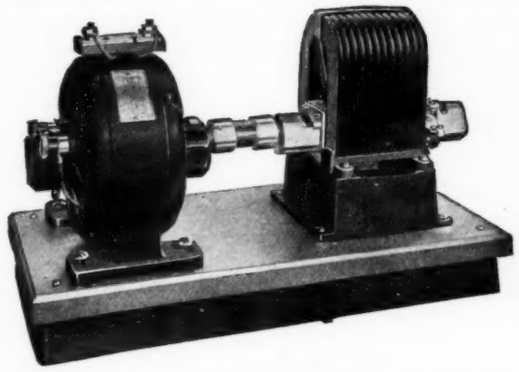
Inasmuch as the differences between the city and the company have been settled out of court, no refund is to be made by the company of the amount between the temporary higher rate and the rates in the foregoing schedule.

Toll Line Ordered Between Manawa and Ogdensburg, Wis.

On October 31, the Wisconsin Railroad Commission issued an order requiring the Ogdensburg Telephone Co., of Ogdensburg, and the Manawa Telephone Co., of Manawa, to jointly construct and operate a clear toll line between their respective exchanges and file a suitable rate for the transmission of messages thereover.

This ruling was handed down as the result of an investigation held on the commission's own motion of the petition of several subscribers of the Ogdensburg company for authority to secure service from the Manawa company at Manawa.

The Ogdensburg company serves a very limited territory, and it pointed out to the commission that it could not successfully maintain its exchange if any considerable



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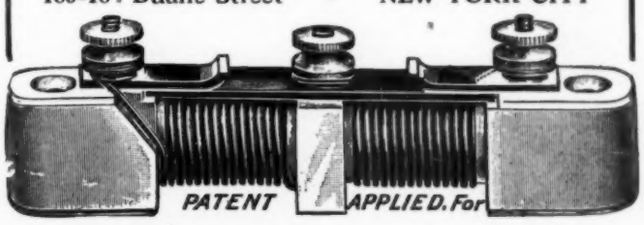

number of its patrons were transferred to the Manawa company.

The principal reason given for a change in service was that difficulty had been experienced in transmitting messages promptly over the toll lines of the Wisconsin Telephone Co. between Ogdensburg and Manawa, via Waupaca. A charge of 10 cents is made for all toll calls.

Inasmuch as a pole line owned in part by both companies extends between the two towns and the subscribers have indicated their willingness to pay the existing toll rate if some provision were made for expeditious toll service between the two exchanges, the commission ordered the two companies to begin work immediately on the joint construction and operation of a toll line.

New Toll Rates Approved—Discount Rule Modified.

New toll rates were established by the Preston Farmers Telephone Co., of Blair, Wis., on November 1, under a ruling handed down by the state railroad commission on October 31 approving the proposed schedule.

In the future only non-subscribers will be charged toll rates for calls to stations of companies with which the Preston company has agreements for free exchange of service. Toll rates for calls to stations of companies with which it has no such agreement will be applicable to subscribers and non-subscribers alike. The toll rates are to be based on air line mileage and the charge divided between the companies on the basis of the toll line mileage used in the transmission of the message.

The schedule approved follows:

Calls between Blair and Whitehall, Pleasantville, Taylor, Independence, Ettrick, and Pigeon Falls, 10 cents for the first five minutes with a charge of five cents for each additional three minutes.

Calls between Blair and Galesville, Northfield, Hixton, Arcadia, and Elk Creek, 15 cents for the first five minutes with a charge of five cents for each additional two minutes.

Calls between Blair and Osseo, Strum, and Eleva, 20 cents for the first five minutes, with charge of five cents for each additional two minutes.

Calls between Blair and Mondovi, Gilmanton, and Cochrane, 25 cents for the first five minutes, with a charge of five cents for each additional minute.

The company is also granted permission to change its discount rule, as it appeared necessary to the commission to provide a further incentive for prompt payment. In the future the yearly rental will be $16 with a discount of $1 if paid on or before March 1, and a penalty of 50 cents if not paid before July 1, and a total penalty of $1 if not paid on or before December 1. Night calls and non-subscriber calls are to be 10 cents.

The Preston Farmers Telephone Co. furnishes magneto telephone service to approximately 350 subscribers in the village of Blair and the surrounding rural territory.

Summary of Commission Rulings and Schedule of Hearings.

CALIFORNIA.

November 18: The Pacific Telephone & Telegraph Co. granted a certificate authorizing it to exercise franchise rights granted by the city of Arcata.

November 22: Application filed by Mrs. C. Pemberton, of Lancaster, Los Angeles county, for an order requiring the Antelope Valley Telephone Co. to furnish a 24-hour service. Mrs. Pemberton, who gives her occupation as farmer, says the central office is closed eight hours during each week day, 18 hours on Sundays and 20 hours on holidays.

ILLINOIS.

December 1: Hearing at Chicago on citation order issued requiring the Lena Electric Light & Power Co., the Interstate Light & Power Co., the Stockton Electric Co., and the Pearl City Independent Telephone Co. to show cause in the matter of inductive interferences on telephone circuits in Jo Daviess, Stephenson, and Carroll counties.

December 1: Hearing at Springfield on application of the Cordova Telephone Co. for authority to increase rates in Cordova.

MINNESOTA.

December 13: Hearing at Erskine on application of the Garden Valley Telephone Co. for authority to have the toll rates which now apply to non-subscribers only, made applicable to all users and subscribers of the company. This is the first of a series of hearings to be held on this application. Other hearings will be held December 14 at Plummer, December 15 at Fosston, and December 16 at Fertile.

NEBRASKA.

November 21: In the matter of the application of the Hamilton County Telephone Association for a change in schedule of rates; it appearing that it has been the practice of the company, under proper authority of this commission, to collect a maintenance fee of $3 when a desk telephone is ordered, and it also appearing that it does not desire to apply paragraph 8 of the service connection charges order, which adds a dollar thereto, and the request being deemed reasonable, the change asked for is granted.

November 21: The application of the Ohiowa Telephone Co. for permission to be relieved of all obligations under the service connection charges order and to waive all its rights thereunder, found to be reasonable and granted.

November 21: In the matter of the application of the Battle Creek Telephone Co. for permission to change Sunday hours; it appearing that the company now gives continuous service from 6 a. m. until 10 p. m., with emergency service thereafter, and that the situation does not require it, ordered that a schedule be filed with the commission from which a study and order may be made.

November 22: In the matter of the application of the Farmers Telephone Co. of Dix for permission to make certain charges; ordered that the company be authorized, after December 1, to make these charges: Extension bells, 30 cents a month; business extensions, $1.00; residence extensions, 75 cents; loud-ringing gongs, 50 cents.

November 22: In the matter of the application of the Platte Telephone company for permission to increase rates; hearing continued to some day hereafter to be agreed upon.

November 22: Complaint filed by Charles Dickinson, of Lincoln, alleging inferior service by Lincoln Telephone & Telegraph Co.

November 22: In the matter of the application of the Cuming County Independent Telephone Co. for permission to issue $16,000 worth of additional stock for the purpose of making additions and betterments; found to be reasonable and authorized accordingly.

November 23: Complaint filed by Farmers' Union of Boyd county demanding termination of existing rates of Northwestern Bell Telephone Co. and a reduction of 10 per cent from old rates.

November 23: In the matter of the application of the Grant Telephone Co. for permission to increase rates; the evidence submitted showing the necessity for added revenues, it was ordered that the company be authorized to collect, after December 1, 25 cents a month in addition to existing rates.

November 25: Application filed by the Union Telephone Co., of Wausa, asking for the fixing of just and reasonable rates upon its Bloomfield exchange and for permission to collect metallic rates at exchanges at Wausa and Crofton when the lines shall have been converted.

November 25: Complaint filed by E. J. Bohling, of Sedan, against Lincoln Telephone & Telegraph Co., alleging improper maintenance over a railroad crossing.

December 2: Hearing ordered for this rate at Geneva on the application of the Lincoln Telephone & Telegraph Co. for permission to discontinue exchange at Strang.

December 12: Hearing ordered at Bloomfield for this date on the application of the Union Telephone Co., of Wausa, to fix a just and reasonable rate for service at Bloomfield and to fix metallic rates for Crofton and Wausa exchanges.

NORTH DAKOTA.

November 21: Permission granted the Silver Bow Telephone Co., of Bowman, to abandon and remove eight miles of telephone lines.

November 21: Report charges filed by the Dakota Central Telephone Co., of Linton, approved by the commission.

November 21: Application filed by the Norton Telephone Co., of Lankin, for authority to issue $10,000 worth of bonds.

November 21: Application filed by the Kathryn-Kidville Telephone Co., of Kathryn, for authority to make a division of its telephone property.

OHIO.

November 17: Application of the Newark Telephone Co. for authority to increase rates at Gratiot suspended until such time as the service is improved.

OKLAHOMA.

November 15: Rates of the Stonewall Telephone Co., of Stonewall, reduced from $3 to $2.50 per month for business service and from $2 to $1.50 per month for residence service at the request of the company.

WISCONSIN.

November 23: The New Cashton Telephone Co., of Cashton, authorized to establish a 5 cent toll rate between Cashton and Bloomingdale and Cashton and Dell upon the furnishing of clear toll lines between these points. Higher rates asked for by the company were held in abeyance pending an improvement in service.

November 23: Higher rates asked by the Farmers & Merchants Telephone Co., operating in Lena and Coleman held in abeyance, until service is improved.

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Convention: Pennsylvania, Harrisburg, January 12-14, 1922

Automatic Electric Co. Opens Merchandising Department.

It is announced that the Automatic Electric Co., Chicago, long known in the telephone field as the originator and manufacturer of the Strowger automatic telephone system, has extended its organization and activities to cover the entire electrical field, and is in a position to furnish at minimum prices, material and equipment of all kinds required in the construction, operation and maintenance of telegraph, telephone and electrical plants of every class.

The company will continue to devote its attention to the manufacture of automatic telephone apparatus as well as offering the trade the advantages of its new merchandising service. J. H. Finley is manager of the company's merchandising department.

Death of Herbert W. Reade of National Pole Co.

In the passing of Herbert W. Reade, vice-president and treasurer of the National Pole Co., of Escanaba, Mich., whose death occurred recently, the telephone industry has lost one of its most capable men and best friends.

Mr. Reade was borne in Romeo, Mich., August 20, 1867. After completing his education in the public and high schools of Romeo he located at Newberry, Mich., keeping books in a general store there.

In 1888 he went with the Pittsburgh & Lake Superior Iron Co., at Whitney, Mich., as manager of the store and charcoal plant, later acting as secretary and treasurer of this organization. The company engaged in the business of manufacturing cedar poles and ties from its own lands soon after Mr. Reade entered its employ, and in 1905 the cedar department of the company was taken over by the National Pole Co.

Mr. Reade was a member of the Escanaba Commandery, Knights Templar, and of the Ahmed Temple, Mystic Shrine, at Marquette, Mich.

Mr. Reade believed implicitly in giving his customers the best of service and that his policy repaid him is attested by the many expressions of satisfaction of his customers as to the products of the National Pole Co.

BOOK REVIEW.

CIRCUITS OF VICTORY, by A. Lincoln Lavine. Published by Doubleday Page & Co., Garden City, N. Y. 634 pages, 5¼ ins. by 8 ins., with many illustrations. Price $3.

As its alluring title suggests, this book is a history of the world war from the standpoint of communications. The organization and astonishing accomplishments of the U. S. Signal Corps constitute its broad subject. It contains 51 chapters besides as introduction.

No other conclusion can be reached after reading "Circuits of Victory" than that had the telephone system in America not reached its present stage of development until some future date, the history of the World War might have been a different one indeed.

The Late H. W. Reade, Vice-president and Treasurer, National Pole Co., Escanaba, Mich.

The first of the three main sections is called "Fingers of Destiny." It is a brilliantly written analysis of the situation in America from a communications standpoint during the period of America's neutrality. Contrasted with the years of preparation for war on Germany's part that made the conflict inevitable, is America's military unpreparedness, but with the telephone as an institution unifying the nation, abolishing sectionalism, and mobilizing public opinion.

The transcontinental line between the Atlantic and Pacific coasts was opened in January, 1915. Experiments in wireless telephony in transmitting human speech to such distant points as Paris and the Hawaiian Islands, had been successfully conducted by Bell engineers in October of that same year.

A few months later, Secretary Daniels mobilized the navy by utilizing the wires of the Bell System and the Hawaiian Islands, had been successfully conducted by Bell engineers in October of that same year. A few months later, Secretary Daniels mobilized the navy by utilizing the wires of the Bell system and its wireless telephony adjuncts. It was gradually realized by American military leaders that the United States was possessed of a system of electrical communication, the first line of offense and defense, whose strategic value overwhelmingly surpassed anything of the kind that any nation had to offer.

In Part 2, "From Fingers to Fist," America goes to war. The part played by the telephone in mobilizing American industry and man-power is described with understanding and appreciation. The Bell system is shown in uniform, building telephone facilities for army camp, naval station and war communities with amazing speed, lending trained executive personnel for government posts of tremendous responsibility, recruiting from its ranks, under Colonel Carty's direction, the 12 famous Bell battalions, and two radio companies, comprising specialists in every branch of the telephone business, whose exploits in construction, maintenance and operation soon amazed all France, and made the A. E. F. a cohesive fighting force.

Part 3, called "Fist," describes the mighty blow that turned back the Hun. It will give telephone workers a new and broader vision of America's contribution to the success of the Allies, for it particularly deals with the functioning of the communications systems of the American army as it made its sensational advances at Chateau-Thierry, St. Mihiel, and at the Battle of the Meuse-Argonne.

Captain Lavine, himself an overseas veteran, has some remarkable word pictures in these chapters. His sense of dramatic values is acute. His knowledge of the problems of communications during those critical days is thorough. He lifts the curtain upon scenes of war in its naked hideousness, and in the foreground are telephone men stringing wire along roads clogged with trucks and marching soldiers, operating the underground switchboards, defying bullet and shell as they mend the open wire breaks, or joining the combat troops in the rush over the top, reeling out the twisted pair that will carry the news of objectives gained or help needed—telephone men where the fight is fiercest, but armed with a test set instead of a rifle, or a pair of pliers instead of a pistol. These will be thrilling chapters to telephone workers.

Woven into Captain Lavine's narrative is the story of wonderful accomplishments

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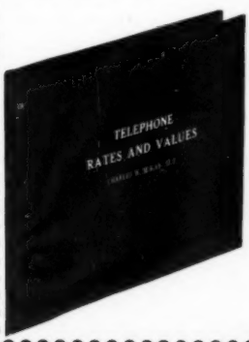

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in invention and manufacture. With appealing sincerity he narrates the fortunes of the devoted band of operators who went to France for special duty, whose first "Number, please?" after arrival evoked from some officer the fervent exclamation, "Thank God, you're here at last!"

More than facts are imposingly marshaled in his pages. Hundreds of personalities walk across the screen. There are intimate touches that lighten every chapter. It is these touches, gleaned from a close study of government reports, the official histories of the Bell battalions, and from personal accounts, that help so much toward making the book a vivid, swiftly moving story of the lives, struggles and accomplishments of telephone men and women, who undertook a task calling for almost superhuman effort, and who accomplished that task nobly.

After reading the advance sheets of the book, Colonel Edgar Russel, who was chief signal officer of the A. E. F., heartily congratulated Captain Lavine "in the production of so satisfactory a volume."

"No one," says Colonel Russel, "can fail to read with absorbed interest your history of the work done in France by the thousands of technical men from the great commercial telephone, telegraph and electrical enterprises of America and to many it will bring back forcefully memories of that 'crowded hour of glorious life.'"

Paragraph.

THE BELDEN MFG. CO., of Chicago, announces the appointment of C. P. Cushway as manager of the cable and specialties department. Mr. Cushway will have supervision over that part of the business pertaining to telephone, automobile and appliance cord assemblies, cordage, flexible cable and insulating materials, and to this work brings several years of experience in the company's engineering department.

Condensed Telephone News

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items Relating to Construction, Rebuilding, or Changes in Their Plants and Systems

New Telephone Companies and Incorporations.

SEBRING, FLA.—The Mitchell Telephone Co. has been incorporated with $5,000 capital stock to own and operate, build and equip telephone systems, exchanges and telephone lines of every kind and description. The highest amount of indebtedness is not to exceed $25,000 and the corporate existence is 99 years. L. L. Morgan is president of the new corporation; George V. Russell, vice-president; and W. B. Mitchell, secretary and treasurer.

VERSAILLES, ILL.—The Versailles Telephone Co. has been incorporated with a capital stock of $5,000. The incorporators are Ralph Reid, F. S. Morgan, Allen Thurman, E. C. Bates and J. H. Robinson.

DUNCAN, KY.—The Peoples Telephone Co. has been incorporated with $7,000 capital stock by T. C. Woods, S. W. Sanders and W. E. Graham.

FLY, OHIO.—The Trail Run Telephone Co. has been incorporated with $6,000 capital stock by C. H. Busche, W. J. Ridgway, J. J. L. Moore, and W. H. Demit.

MASON, WIS.—Articles of incorporation were recently filed by the North Wisconsin Telephone Co. The company's capital stock is $9,000 and its incorporators Henry Hagstrom, Nels Swanson, and E. B. Bartlett.

CAZENOVIA, N. Y.—Charter issued to the Cazenovia Telephone Co. The company's capital stock is $100,000, consisting of shares of $100 each and its directors are: Henry Burden, M. R. Joy and A. B. Carpenter, all of Cazenovia.

Construction.

MOUNTAIN HOME, ARK.—The Interstate Telephone Co. is setting new poles on its line here and making other improvements to its plant. A meeting of farmers living east and south of Henderson was held recently and arrangements made to connect with the Mountain Home line. It is probable that the Interstate company will put in a switchboard at that point.

HERRIN, ILL.—A new section of switchboard has been installed at this exchange of the Murphysboro Telephone Co., under the direction of J. T. Davis, manager at the company's Carbondale exchange. An additional section of switchboard has also arrived for the Duquoin exchange and the work of installing it is now under way.

BLUE EARTH, MINN.—The Blue Earth Valley Telephone Co., which operates some six exchanges in Faribault county, is rebuilding its exchanges here with an underground cable plant. The business district was rebuilt some four years ago with underground cable placed in fibre conduit and covered with concrete. The balance of the exchange cable, now being installed, is being placed in trench from two to four feet deep, without conduit. The Blue Earth exchange serves approximately 1,100 town and rural subscribers.

LINCOLN, MONT.—Rapid progress is being made in the construction of a telephone line between this point and Helena, according to recent reports. Poles have been set from Lincoln to the foot of Stemple hill, and trees will be utilized for poles going up over the hill. It is estimated that approximately 15 miles of the line has been finished.

DESHLER, NEB.—The Deshler Telephone Co., each of its 460 telephone users being the owner of a share of stock, has just let the contract for a new building to cost $2,500. It is one of the more prosperous Independent companies of Nebraska, and serves a community that has financed, in the last few years, three large industries.

PORTLAND, ORE.—Work is now under way by the Pacific Telephone & Telegraph Co. on the construction of 22 miles of its line between this city and Forest Grove, at a cost of approximately $60,000. New poles are being placed along the entire line and the existing iron circuits are to be replaced with copper. In addition to the new line to Forest Grove, it is planned to have additional circuits link in Beaverton and Hillsboro.

LYNCHBURG, VA.—Estimates were recently approved by the board of directors of the Chesapeake & Potomac Telephone Co. calling for the expenditure of $21,000 in this city on the installation of additional telephone facilities. Work is now under way on the improvements which call for new cables on several of the exchanges and the replacing of twisted wire with cables carrying sufficient pairs of wires to care for present needs.

WALWORTH, WIS.—Arrangements were recently completed by the Walworth Telephone Co. to string a cable from Walworth to Fontana, a distance of two and one-quarter miles, replacing open wire construction. This will greatly increase the efficiency of the suburban service to summer resort subscribers on Geneva Lake.

Financial.

LEBANON, KY.—The Lebanon Home Telephone Co. has recently increased its capital stock from $7,500 to $30,000. T. M Estes is the manager.

MANSVILLE, KY.—The Taylor County Telephone Co. has increased its capital stock from $10,000 to $25,000.

SILER, KY.—The Poplar Creek Telephone Co. has increased its capital stock from $1,600 to $2,600.

MEDINA, OHIO.—The Medina Telephone Co. has increased its capital stock from $44,500 to $64,500.

SIDNEY, OHIO.—An increase in its capital stock from $184,500 to $234,500 has been announced by the Sidney Telephone Co.

CROSBY, TEXAS.—An amendment to its charter has been filed by the Crosby Telephone Co., changing its name to the Goose Creek Telephone Co. and increasing the capital stock from $5,000 to $15,000.

Elections

MATLOCK, WASH.—James Carstairs was elected president of the Matlock District Telephone Co.; C. O. Decker, vice-president; Nels C. Nelson, secretary-treasurer; James Valley, Frank Helin, and Marshall Palmer, trustees, at a recent meeting of directors of the company.

Miscellaneous.

BENTON HARBOR, MICH.—Word has been received that the Spinks Corner Telephone Co., for many years under the control of Philip Yund, has been sold to a syndicate of men of this city. Plans are under way for the erection of a new exchange and general improvements to the equipment. This company has lines throughout Berrien, Van Buren and Cass counties.

BETHANY, WEST VA.—The Bethany Telephone Co., formerly under the control of W. H. Cramblett and W. T. Boohr, has been transferred to the Bethany Improvement Association.